

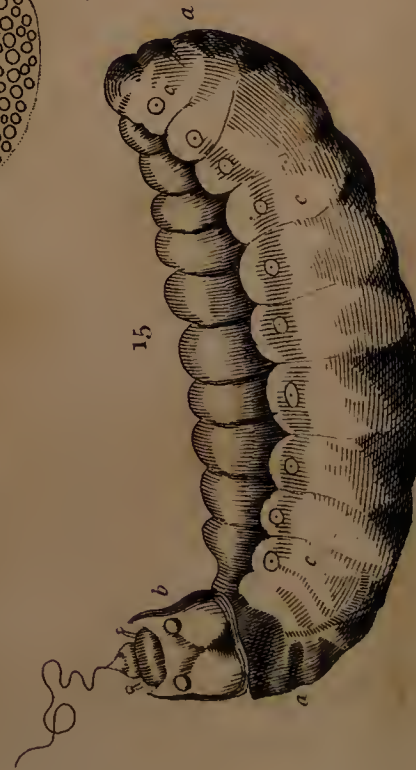
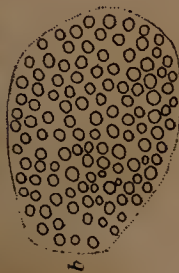
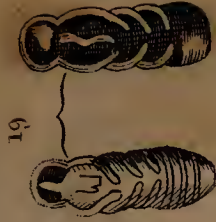
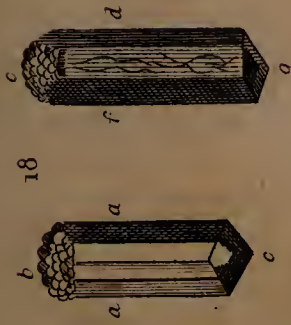
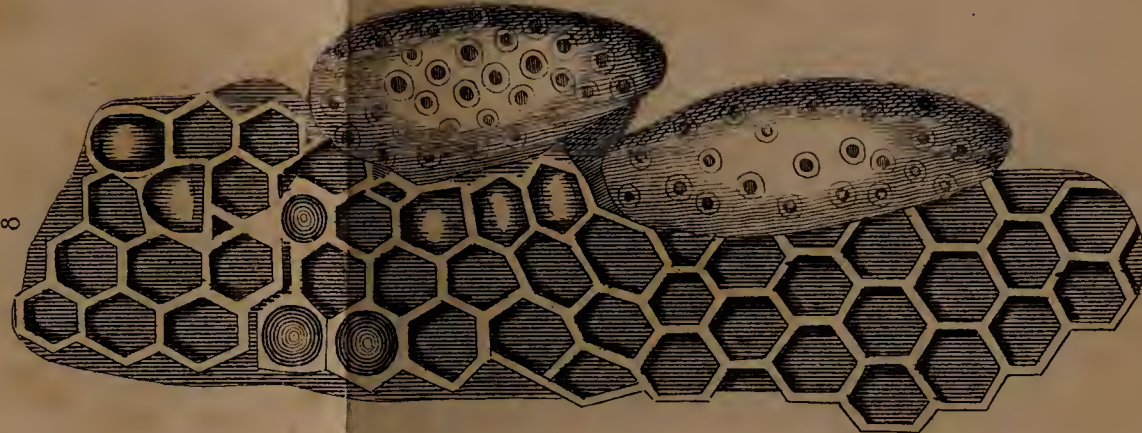
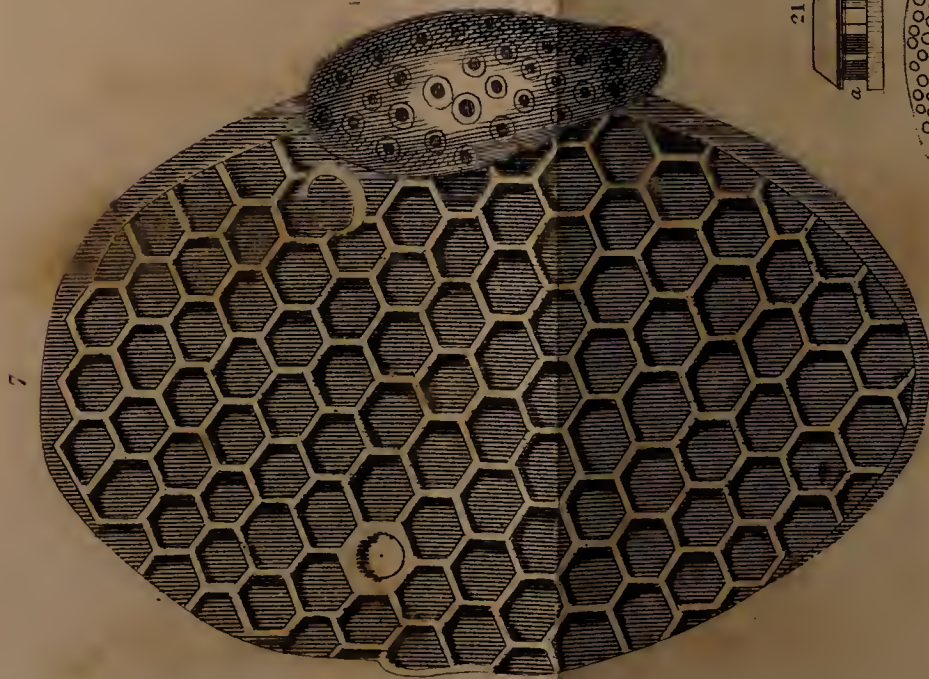
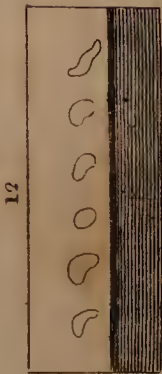
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NATURE DISPLAYED

IN THE

HEAVENS,

AND

ON THE EARTH,

ACCORDING TO THE LATEST

OBSERVATIONS AND DISCOVERIES.



By SIMEON SHAW, L.L.D

THERE is a pleasure in the pathless woods,
There is a rapture on the lonely shore,
There is society, where none intrudes,
By the deep sea, and music in its roar;
I love not man the less, but nature more,
From these our interviews, in which I steal
From all I may be, or have been before,
To mingle with the universe, and feel
What I can ne'er express, yet cannot all conceal.

LORD BYRON.

IN SIX PARTS.

PART V.

LONDON:

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END OF PART V.

* * The Index to this Part will be found at the End of the Volume, or end of Part VI.



DESCRIPTION
OF THE
ENGRAVINGS IN PART V.

THE BEE AND ITS ECONOMY.

The history of these insects would fill many volumes: the accompanying engraving, however, exhibits a luminous view of the structure and economy of the bee.—*Fig. 1*, is the queen-bee. 2, The drone. 3, The working-bee. 4, Represents the bees hanging to each other by the feet, taking their repose. 5, The proboscis or trunk magnified, with which they gather the honey and take their nourishment. 6, One of the hind-legs of a working bee loaded with wax. 7, A comb, in which the working bees are bred: the cells are the smallest of any: a royal cell is suspended on one side. 8, A comb in which the drones are bred, being larger than the former; the young drones being included in several of them: with two royal cells suspended on the side. 9, A similar comb, in which the royal cell is fixed in the middle, and several common cells are sacrificed to serve as a basis and support to it: in general, the royal cells are suspended on the side of a comb, as in *fig. 7, 8*. At the side of *fig. 9*, two royal cells are begun; they resemble pretty much the cup in which an acorn lies: the other royal cells have the young queens included in them. *Fig. 10*, exhibits the sting and all its parts, magnified: the sting is composed of a sheath or case, and two shanks, united to each other, and terminating in a sharp point, so as to look like a single part: *b*, the poisonous bag; *c*, the tube that conveys the poison to the sting; *dd*, the two shanks of the sting; *ee*, the sheath of the sting; *ff*, the thickest end of the sheath, where the tube opens into it with the poison; *g*, the point of the sting; *h*, the beards or jags with which the sting is armed; *i*, the tube that secretes the poison; *kk*, extremity of the tube; *lll*, cartilages which are articulated with the shanks of the sting; *mm*, two other cartilages, less than the former; *nnnn*, places where the foregoing cartilages are articulated; *oooo*, four muscles serving to move the sting different ways; *pp*, two muscles which draw the shanks of the sting into its sheath; *qq*, two appendages of the sting, which are moved along with it, and seem to answer no other purpose than that of ornament. *Fig. 11*, The ovary. 12, Six eggs drawn after nature, and placed on their ends. 13, An egg viewed with a microscope: it resembles the

skin of a fish, divested of its scales, but still retaining the marks of their insertion. 14, Worms of bees, of different sizes, drawn after nature: *a*, a worm newly hatched; *b c d e*, four worms that have received more nourishment, and are more grown; *f g*, two worms still larger than the former, having had more nourishment provided for them: they are represented as they lie doubled in their cells; *h*, a worm placed in its belly, so as to show on its back a black line, which denotes the stomach; *i*, a worm lying on its back, beginning to draw in the hinder part of its body, and move its head. *Fig. 15*, A full-grown worm viewed with a microscope: *aa*, its fourteen annular incisions or divisions; *b*, the head and eyes, &c.; *ccc*, ten breathing holes. 16. The worm forming its web; *aa*, the sides of the cell that contain it; *b*, bottom of the cell; entrance or door of the cell: the worm is here represented as making its web to shut up this entrance. *Fig. 17* A worm taken out of the web, and just ready to cast its skin. 18, A cell containing the worm changed into a nymph, and perfectly lined with the worm's web: likewise the web entire, with the nymph contained in it, as they appear on opening the cell; *aa*, the sides of the cell, lined with the worm's web; *b*, the mouth of the cell, closed by the web; *c*, the bottom of the cell; *d*, the web entire, as it appears on opening the cell, which it greatly resembles in form; *e*, the upper part of the web, of a convex form: this part shows its filaments pretty distinctly; *f*, the inclosed nymph appearing through the transparent sides of the web; *g*, the bottom of the web answering to that of the wax cell. *Fig. 19*, is a worm changed to a nymph, of its natural size and form, yet so as to exhibit its limbs, which are folded up in a curious manner. 20, The nymph of the bee viewed with the microscope, displaying all the parts of the inclosed insect, and the beautiful manner in which they are laid up: *a*, the head bloated with humours; *bb*, the eyes projecting considerably; *cc*, the horns, or antennæ; *d*, the lip; *ee*, the teeth, or jaw-bones; *ff*, the first pair of joints belonging to the proboscis; *h*, the proboscis itself; *ii*, the first pair of legs; *kk*, two transparent little parts, lying against the lowest joints of the first pair of legs; *ll*, the second pair of legs; *mm*, the wings; *nn*, the blade-bones; *oo*, the last pair of legs; *pp*, the abdominal rings; *q*, the hinder part of the body; *r*, two little parts accompanying the sting; *s*, the anus. *Fig. 21. a*, A cell full of bee-bread, placed in layers; *b*, little grains, of which the said substance, viewed with a microscope, appears to consist.

THE FALLOW-DEER.

Deer are now the only race of forest animals surviving in Britain. The fallow-deer, of which an engraving is given, are of a reddish brown colour, spotted with white, with noble branching antlers. The colour of the fallow-deer varies more than that of the stag, and its tail is longer: but, in other respects, the affinity is very close.

The young deer in his first year is called a *fawn*; in his second, a *pricket*; in his third a *sorel*; in his fourth, a *sore*; and in his fifth, a *buck*. The female in her first year is called a *fawn*; in her second, a *teg*; and afterwards a *doe*.

The varieties of this noble species now ornament the parks of our nobility and gentry.

THE BULL-DOG.

The bull-dog has altogether a fierce and displeasing appearance; a large thick head, short nose, and the under jaw shorter than the upper. His courage in attacking the bull is well-known; his fury in seizing, and invincible obstinacy in maintaining his hold, are equally ferocious. This variety is almost peculiar to England: the genuine breed, however, is becoming scarce.

THE HEDGE-HOG.

This harmless creature is about a foot long. Its colour is a greyish brown: the head, back, and sides, are covered with sharp-pointed prickles. His body is an oblong mass, convex above, terminated on the fore-part by a very sharp muzzle, and mounted on four short legs, of which nothing appears but the feet. When disturbed, it rolls itself up in a globular form, and thus presents an invulnerable ball of prickles.

THE OTTER.

There are two species of this animal, the sea otter and the common otter, which latter is the kind represented in the engraving. It is about two feet long, and covered with fur of a deep brown colour. It frequents rivers and lakes containing fish, among which it is very voracious. Its habitation is very curious: the entrance is in a hole under the water, and it afterwards works upwards, nearly to the surface of the bank, forming several apartments, and making a very small orifice at the top for the admission of air, contriving that the hole shall be under a bush for concealment. They are capable of being tamed, will follow and seize fish for their master. When chased by dogs, they defend themselves with courage; and are particularly obnoxious to beavers, who drive them from their haunts.

THE FOX

Is at present the only predatory animal in Britain. He is, however, timid and shy, and his attacks are confined to

the poultry in farm-yards. These larcenies are, however, punished by extermination wherever he is found: under pretence of avenging the public, but in reality for want of a more worthy employment, scores of men and dogs are engaged during a considerable part of their lives in hunting this puny animal. Many are even bred and kept for the purpose, and thereby occasions are created for this extraordinary pursuit.

The fox has a broad head, sharp snout, flat forehead, brilliant and expressive eyes, sharp erect ears, and bushy tail: his colour is a brownish red.

THE CUR-FOX.

The cur-fox is a variety of the common fox, described above. His habits and disposition for craft are the same.

THE CAT.

The cat has been too long under the protection of man to need any particular description.

HOGS.

A rude and brutal character proverbially attaches to the swinish tribe: their habits are gross; they are so voracious that they devour every thing indiscriminately. There are many varieties of this tribe, all very prolific; and they live from twenty to thirty years.

THE POLE-CAT.

The pole-cat commonly forms a subterraneous retreat beneath the roots of large trees. It preys on poultry and small animals, and is a cruel enemy to rabbits. It is also fond of milk and honey, and will occasionally prey on fish. The smell of the pole-cat, like most of the weasel-tribe, is very offensive. The fur, however, is beautiful, and much sought for as an article of dress.

THE CLYDESDALE HORSE.

This race is strong, hardy, active, and calculated for hilly districts. They can live upon coarse food, and are well suited for the cart or plough.

The colour is brown or grey; the head and body light and well formed; and the height from fifteen to sixteen hands and a-half.

THE SUFFOLK-PUNCH.

The Suffolk-Punch Sorrels have large bodies, short legs, and ill-formed heads; yet, notwithstanding their awkward

appearance, they exceed every other race for draught and agricultural purposes.

THE ASS.

The value of this ill-treated quadruped is overlooked in the superior qualities of the horse: in this country especially, he falls to the lot of the lowest hucksters. He is of an affectionate disposition; for, although so ill-used, yet he seems partial to his owner, scents him at a considerable distance, distinguishes him from others in a crowd, knows the road he has passed, and the place where he sojourns; and, when he is so fortunate as to meet with a humane master, he well repays his tenderness.

The ass, like the horse, is three or four years in growing, and lives also like him twenty-five or thirty years.

Extreme temperance, both in quantity and quality of provisions, is a striking feature in the character of the ass. He is satisfied with the most neglected weeds, making his humble repast on what the horse, cow, and sheep, refuse. He sleeps less than the horse, and his constitution is stronger.

THE SQUIRREL

Is remarkable for its vivacity, celerity of motion, and general beauty and neatness. It inhabits woods, and lives entirely on vegetables. It seldom descends from the trees, except during a storm, but continues leaping from one branch to another.

Though naturally wild and timid, the squirrel is soon reconciled to confinement, and becomes docile and frolicsome. The beauty of its form, the vivacity of its motions, and the various amusing tricks it acquires, render it a favorite with young persons

THE BADGER.

This inoffensive animal is an object of the brutality of the lowest people, who glory in his helplessness, indulge their drunken propensities by digging into his retreats, and bait him to death with dogs not more brutal and ferocious than their masters.

THE SPANIEL.

Of all animals the dog is the only one which, leaving his fellows, cultivates the friendship of man. To man he looks, in all his necessities, with a speaking eye for aid; for him exerts all his best services with cheerfulness and pleasure and bears famine and fatigue with patience and resignation;

injuries cannot abate his fidelity; nor distress induce him to forsake his benefactor. Studious to please, and fearing to offend, he is a humble, stedfast, dependant; and, in him alone, fawning is not flattery.

The spaniel was originally a native of Spain, (whence its name,) but is now so completely naturalized, that it may be considered a British animal. Dogs of this kind vary in size.

When an eminent painter was desired to represent a poor man's funeral, he drew the bier without mourners; but, by a happy thought, represented his dog following the bier, with his ears pendant and his tail depressed,—a noble and expressive compliment to the fidelity of the canine race. On a field of battle dogs have been known to set by the side of their murdered masters for many days without food. It lately happened that two farmers were imprisoned in the Fleet, and, their dogs not being allowed to enter the prison, the faithful creatures remained at the door by night and day, the one for ten months and the other for nearly two years.

THE GREYHOUND.

The greyhound is the swiftest of the canine race; but, not possessing the faculty of scent, it follows only by the sight.

THE GOAT.

Goats are distinguished from sheep, not only by their hairy covering, which varies with climate; but also by their horns, which are hollow, annulated, and gently inclining backwards. It delights in climbing the ridges of houses and precipices; its hoofs, being hollow underneath and with sharp edges, render its footing secure on the steepest ridges. The milk of the goat is sweet and restorative, and well adapted to stomachs of weak digestive powers, and is therefore often found more salutary than any medicine in consumptive cases.

THE MULE.

This useful and hardy animal is the produce of the horse and the ass. No quadrupeds are so sure-footed or convenient for large burthens; hence, in Spain, among the Pyrennees and the Alps, its services are highly estimated, as it will tread with the utmost security where a horse can hardly stand. Their manner of descending the most frightful precipices is interesting. When they come to the edge of a deep declivity, they stop; then place their fore-feet in the posture as if to stop themselves; they next put their hind-feet together,

a little forward, as if in the act of lying down; and in this attitude, having surveyed the road, they slide down with the swiftness of a meteor, following exactly the different windings of the road. Drovers of mules are chiefly seen in Spain.

THE RACE-HORSE.

By judicious mixture and superior management, the English race-horse excels those of Europe, or, perhaps, the whole world. For supporting continued violent exertion they are superior to the Arabian, the Barb, or the Persian; and for swiftness they yield the palm to none.

Horse-racing is of considerable antiquity in this island, and may be traced as far back as the eleventh century, but was not regularly pursued till the accession of the House of Stuart. It became a royal fashionable amusement under Charles II. and has so continued to the present time.

THE CART-HORSE

Is remarkable for its beauty, symmetry of form, and large size, possessing superior strength of constitution, hardness, and bone. They come into use at two years old. The English breeds are equal to those of Flanders, and superior to those of other countries. London furnishes horses able to draw on level ground, for a short space, three tons.

THE RABBIT.

The rabbit much resembles the hare, but is considerably smaller, and its fore-feet are furnished with larger and sharper claws, enabling it to burrow in the ground, and to form convenient retreats for concealment by day; like the hare, it feeds chiefly by night or very early in the morning.

The rabbit lives eight or nine years, is a prolific animal, being known to breed seven times in a year, producing eight young ones each time.

THE HARE.

The hare is one of the most innocent and most timid of quadrupeds. It frequently keeps all day in its form, and only feeds by night. Its eyes are prominent, to see behind and before; and, if disturbed, it will fly at the slightest alarm, but, after various doublings, it will return to the place from whence it set out.

The fore-legs of the hare being the shortest, it always runs swifter up hill than on even ground; hence, when pursued, it generally takes to rising grounds. The voice of the hare

is never heard, except when seized or wounded, when it much resembles the cry of an infant.

The hare is preyed upon by foxes, wolves, eagles, hawks, and kites; which, together with the more destructive pursuits of mankind, contribute to reduce the number; else, from their prolific nature, they would multiply excessively.

The fur is employed in the manufacture of hats; but its flesh is forbidden both by the Mosaical and Mahommedan laws.

THE COMMON MOUSE.

This active, but timid and cautious, creature, is entirely domesticated. Fearful by nature, but familiar from necessity, it attends on man; and, only in searching for its food, quits its retreat. It may be tamed to a certain degree by music, to which the race are singularly attached, but never entirely loses its timidity.

There are several varieties, distinguished by their colour; but the most rare and beautiful are the white with red eyes.

THE RAT.

Of the forty-one species which this genus of animals comprises, three are natives of Britain, viz. the black rat the brown or Norway rat, and the water rat. Each species is very prolific, and all are distinguished by their voracity.

THE LONG-HORNED OX.

The long-horned or Lancashire breed is an original species, of high antiquity, still found in considerable, if not entire, purity of form. The species, with few exceptions, are too slow and sluggish for labour; which circumstance has induced many persons to form erroneous conclusions on the subject of ox-labour. But other advantages, which this breed evidently possess, concur to render it worthy the extensive introduction it has obtained. The peculiar rotundity of form and richness of milk has long established their superior character as dairy stock.

CHEVIOT SHEEP.

Of domestic animals, none is so extensively beneficial to man as the sheep kind. Others may excel in strength, docility, and dignity; but the sheep supplies both food and clothing, and is indispensable to our comforts, almost to our existence. The wool of the sheep warms every class of people from the monarch to the beggar; it employs thousands in its manufacture, and whole fleets in its exportation.

The Cheviot breed derive their name from the Cheviot Hills in North Britain. Their legs and faces are white, have a fine open countenance, with lively prominent eyes, a long body, largest on the hinder quarters, the fore-quarters being narrow and low, fine small-boned legs, the wool partly fine and partly coarse, each fleece averaging about three pounds.

SHORT-HORNED BULL.

The short-horns are an original species, but it cannot now be ascertained whether they are aboriginal or were imported in very early times.

This breed has long been in possession of the northern counties, and is esteemed the largest in England.

GALLOWAY BULL.

These cattle are a very valuable breed: they generally weigh from forty to sixty stone. The most essential difference in this to every other breed is in being without horns; though some few have two little horns, from two to four inches long, hanging loose from the parts where the horns of other cattle grow, and joined to the head by loose skin and flesh.

THE AYRSHIRE COW.

This breed is a mixed race between the Kyloes or Highland-bred and the Galloway breed.

THE BEAVER.

The beaver is a native of the northern parts of Europe, Asia, and North America; abounding most in cold regions, and gradually less common towards the south. It is distinguished from every other quadruped by its tail, which is oval, nearly flat, but with a slight convexity upward, devoid of hair, and marked by scaly divisions: this he uses as a rudder to direct his course in the water; its general length being nearly one foot, and that of his body about three feet. The colour of the beaver is a deep chesnut, and its hair is very fine, smooth, and glossy.

The beaver possesses great natural sagacity in constructing its highly-finished and commodious habitation, preparing, in concert with others of its species, arched caverns or domes, supported by strong pillars, plastered internally with neatness and accuracy, excelling the art of any other quadruped.

BEAVERS IN COUNCIL.

In places much frequented by man, Beavers neither associate nor build habitations ; but in the northern regions, in June or July, they assemble from all quarters, for the purpose of concerting their building operations. The place of rendezvous is always on the banks of water. In lakes they make no bank or dam, as the water seldom rises above its level ; but, in rivers or brooks, where the water is subject to rise or fall, they construct a bank like a sluice, often from eighty to one hundred feet long, and ten or twelve broad ; but its solidity is more astonishing than its magnitude.

They make choice of a shallow part of the river, and where a large tree is growing on its banks. This they cut down with their teeth, so that the tree shall fall into the water. They then cut off its branches to make the trunk lie level : in the mean time other beavers cut down smaller trees, which they drag to the margin of the river, and then convey them by water to the place where they are building : these they sink firmly down as piles, interweaving the branches with the stakes. When this is accomplished, they bring earth in quantities to fill up the intervals, which they plash with their feet, and beat firmly down with their tails. The stakes that oppose the stream slope upwards to sustain the pressure ; but the opposite side is perpendicular. To allow the surface-water to escape, they make three or four sloping holes ; and, when any breaches are made in their bank by sudden inundations, they repair them when the water subsides.

This great object being accomplished by the united force and dexterity of the whole community, they separate into smaller societies, and construct their dwelling-places, which consist of cabins of one, two, three, or four stories, according to their families ; they are either round or oval, and vary in size from four to ten feet in diameter. The walls, which are about two feet thick, are neatly plastered both within and without with a kind of stucco, their tails serving for trowels, and their feet for plashing. The situation of these cities are always on the banks of water, and have two openings, the one on the land-side, and the other into the water. The avarice of man frequently breaks up these interesting communities.

THE MOLE.

The mole is well formed for its subterraneous mode of life. Its fore-feet are naked and very broad, having large

palms like a hand, with five toes on each, terminated with strong nails. The hind feet are small, with five toes, and a small thumb on the inside. Its skin is thicker and tougher than other quadrupeds of its size, and the fur surpasses in fineness and softness. This animal is supposed to possess an exquisite power of hearing, though its eyes are scarcely perceptible. It feeds on worms, insects, roots of vegetables, &c. but, generally, it is carnivorous, and in particular circumstances very fierce and voracious.

THE MOLE-CATCHER.

Moles destroy and render useless the grass of meadows, by raising innumerable hills to form their nests, and destroying the roots for a considerable extent around. It therefore becomes an object of consequence to grass-husbandry to exterminate them. The practice pursued by some is to spread out the mole-hills in the spring, but the usual method is to employ mole-catchers, an important class in rural economy, one of whom is represented in his characteristic costume.

THE SOUTH-DOWN BREED OF SHEEP

Is one of the old varieties of sheep in this island, and has from time immemorial possessed the Sussex Downs and Kentish Hills. Of late years, however, they have been introduced into most parts of Britain and Ireland. The wool is very short and fine, from two to three inches long. They are quick feeders, and of a hardy and vigorous constitution.

THE DISHLEY, OR NEW LEICESTER BREED.

These sheep are distinguished from other long-woolled breeds by their clean heads, fine lively eyes, straight and broad backs, round bodies, small bones, and thin pelts. Their peculiar advantages are, fineness and length of wool, well adapted for combing, averaging eight pounds per fleece, and the facility with which they grow fat.

THE SEAL.

The common seal, even when taken old, is capable of being domesticated. One caught on the Welch coast was sent to London by water. During the voyage it became so familiar with the man who had the care of it, as to suffer him to play with it like a dog, and would lick his hands and face with great affection; and such was its attachment to him, that having left it at its place of destination, it emitted

XXIV. DESCRIPTION OF THE ENGRAVINGS IN PART V.

a melancholy noise, evidently bemoaning his loss, and died with apparent grief in the ensuing week.

The usual length of the seal is from five to six feet; the body is closely covered with short hair of various colours, smooth and shining; its tongue is forked at the end; it has two canine teeth in each jaw, six cutting-teeth in the upper and four in the lower, and five toes on each foot, furnished with strong sharp claws, for climbing the rocks, on which it often basks, and where it has been often mistaken by the vulgar for the fabulous mermaid.

SEAL CATCHING.

The immense caverns on the coast of Caithness are much resorted to by seals. About midnight, hunters, with torches and bludgeons, enter the caverns. Having roused the flock, and suffered the larger ones to escape, they despatch most of the young seals by a slight blow on the nose, which immediately destroys them.

THE GUINEA-PIG.

The Guinea-pig is tamed with facility, is inoffensive, timorous, and particularly cleanly. Their food consists of all kinds of herbs, but particularly parsley, apples, and other fruit. In a domestic state, they are very restless, and make a continued noise, similar to the grunt of a young pig.

THE EAGLE.

The eagle is the noblest and most splendid of rapacious birds. Its native fierceness renders it impossible to tame it; and even when deprived of liberty, it must be confined with a chain, or it would be dangerous to those who approach it.

Of all birds the eagle flies the highest; whence the appellation and character of the "bird of heaven" and "messenger of Jove." His sight being most exquisite, he chases by the eye, and darts on his prey with irresistible and unerring aim; easily carrying off geese, lambs, and kids. It is a long-lived bird, and no less remarkable for its abstinence than for its longevity.

THE SPARROW-HAWK.

The sparrow-hawk possesses great intrepidity and sagacity, and is very destructive among young poultry, from which it is not to be deterred even by the presence of man. His courage is so great that he will attack turkeys and even game-cocks.

It has a green cere on the bill, yellow feet, white belly, undulated with grey, and the tail marked with black hairs. The male is about twelve inches long, and the female fifteen.

THE OWL.

Owls, being nocturnal birds, pursue their prey only by night, which is principally small birds and quadrupeds; but they do not reject insects, when they cannot procure more desirable prey.

Destined to seek their food by night, their eyes are so constructed that they see more distinctly in the twilight than in the glare of day. If, therefore, they are accidentally dislodged, or tempted by famine to venture abroad by day, they appear dazzled and distracted. Its appearance by day is sufficient to set the whole grove in an uproar. Legions of little birds flock round it, and, taking advantage of its confusion, treat it with insult.

The head of the owl is round, somewhat like a cat, which animal it strongly resembles in its general modes of life; the bill is hooked, and covered at the base with bristles: the nostrils are oblong; the head, ears, and eyes, very large; and the tongue cleft.

THE HORNED OWL

Inhabits inaccessible rocks and desert places, and preys on hares and feathered game. The horned owl sees better during the day than almost any other of the tribe; the body, which in size equals some of the eagles, is of a tawny red colour, elegantly varied with lines and spots. The wings are long, but the tail is short, and marked with transverse dusky streaks, legs thick, covered to the very end of the toes with a close and full down of a light brown colour: claws great, much hooked, and dusky.

THE CUCKOO.

This singular bird, familiar in most countries, has obtained a name in all languages from the sound of its voice. It is a bird of passage, or at least it disappears early in the summer, and is seldom seen or heard till the middle of April. It is an elegant bird both in form and colours. The cuckoo seldom builds a nest of its own, but deposits its solitary egg in the nest of some other bird, generally the hedge-sparrow, by whom it is hatched. No sooner, however, does the young cuckoo acquire a little strength, than it clears the nest of its young companions, and becomes the whole charge of its foster-mother.

THE FALCON.

The falcon is a species of hawk, and, before the invention of fire-arms, was much used in field-sports, being the only means of taking birds under flight; for which purpose, they used to be trained with care, and kept at great expence.

THE HOOPOE.

This bird is easily distinguished by a beautiful, though enormous, tuft of variegated feathers on the crown of its head, which it can raise or depress at pleasure. The back and wings are crossed with broad bars of white and black, the neck is a pale reddish brown, and the breast and belly white. The hoopoe feeds on beetles and other insects, and makes its nest of dung in the hollow of trees, laying two ash-coloured eggs. It is a bird of passage. It hunts after its prey on the ground, and seldom remains long on the wing.

THE COMMON THRUSH.

The common thrush, or throstle, is the finest singing bird of its kind, not only for the sweetness and variety of its notes, but for the long continuance of its melody. In song it is the nearest rival to the nightingale. It delivers its music from the top of some high tree; but, to form its nest, descends to some low bush or thicket. The nest is made of earth, moss, and straw, and the inside is curiously plastered with clay. It lays five or six eggs, of a pale bluish green, marked with dusky spots.

THE BLACKBIRD.

This bird receives its name from the colour of its plumage; it possesses no small reputation as a songster, though its note is too loud for any place but the groves. Nevertheless, it is often tamed; and, from the faculty of its imitating sounds of musical instruments, it may be taught any tune which is not complicated.

THE BULL-FINCH.

This bird, when tamed, becomes docile; its notes are harsh, but is susceptible of improvement, and by a regular education it becomes a proficient in music. But it is not in docility only that these birds excel, for they are also susceptible of personal attachment to their keeper.

THE SPARROW.

Few birds are more execrated by the farmer than the sparrow, and none perhaps more unjustly. They consume a considerable quantity of grain and fruit; but a pair of them will destroy three thousand caterpillars in a week. Sparrows build their nests under the eaves of houses, or in holes of walls, and lay five or six eggs, reddish white and spotted brown. The affection of the parent-birds to their young is very interesting. They will follow them a considerable way if removed from their nest; and, if opportunity presents, will continue to supply them with food.

THE GOLDFINCH.

Of the finch kind, none are equal to the Goldfinch for beauty of plumage, elegance of form, and melody of voice. This bird would be more the object of admiration were it more uncommon. It is fond of orchards, and usually builds its nest in an apple or pear tree, and sometimes has two broods in a year.

THE CANARY.

This bird is a native of the Canary Islands, where it still abounds, but is never seen in the yellow colour for which it is remarkable in a state of domestication in Europe. The song of the Canary bird is made up of a combination of the notes of the Titlark and the Nightingale, and is very rich and copious.

THE LINNET.

In point of external beauty the Linnet bears no comparison to the Goldfinch or Canary, but it is highly valued for the sweetness of its notes.

THE SKY-LARK.

The sky-lark commonly forms its nest between two clods of earth, and lines it with dried grass and roots. In this she lays four or five eggs. Her maternal affection is extremely interesting, both to the eye and to the heart. When her young are callow, she may be seen fluttering over their heads almost perpendicularly, and by successive springs into the air, frequently hovering over its nest at a vast height without once losing sight of her brood. When it begins to rise, its notes are feeble and interrupted; but, as it ascends, they gradually swell to their full tone, and delight every ear. In descending to their nest, they are so politic as to reach the ground at some distance, and then run concealed in the grass.

THE NIGHTINGALE.

This feathered chorister, so happily described by Milton as most "musical, most melancholy," transcends every bird in the richness of its tones and the variety of its expression. They visit England in April, and add charms to the evening's walk in Kent, Surry, Sussex, and other counties south of the Thames; but are seldom heard to the north of that river. The beautiful melody with which they fill the groves and valleys, arises from the apparent desire of the cock-bird to amuse the hen while she is setting on her nest; the tones are so strong that they may be heard at the distance of a mile.

THE REDSTART.

This bird generally appears in the spring, and is so fond of retirement, that it takes up its abode mostly in woods. Its notes are soft and pleasing.

THE ROBIN.

The name of the robin is a synonyme with innocence and confidence. When snow precludes him from obtaining food, he throws himself on the charity of the merciless tyrant of the feathered race, tapping gently with his beak against a window. If kindly received, he repeats his visits till the snow has disappeared, when, scorning any longer to be a beggar, he provides for himself.

THE WREN.

Although this bird is the most diminutive of English birds, yet she claims respect for her rich plaintive notes, which continue throughout the year. Though so small, it is most elegant in its symmetry.

BRANCHED ASTERIAS, OR MEDUSEAN STAR-FISH.

The several varieties of these zoophytes are found in the British seas. They are covered with a coriaceous coat, with five or more segments running out from a central part, and furnished with numerous tentacula. The mouth is in the centre, armed with sharp teeth, which convey the food into the body, and from this mouth goes a separate canal through many of the rays. These rays the animal, in swimming, spreads like a net to their full length, and, when he perceives any prey within them, draws them in again; thus catching it with all the dexterity of a fisherman.

ANIMAL FLOWERS.

The actinia, or animal flower, sometimes called *Urtica Merina*, has its claws disposed in regular circles, as represented in one of the figures; it presents lively colours, like radiated flowers; the bodies are of various forms, and some are stiff, while others are fleshy. They alter their shape when they extend their claws in search of food, and they can shift their situation, though their movement is very slow. They are found on rocky coasts fixed to some solid substance by a broad base, like a sucker. They have only one opening at the top, and round this are placed rows of fleshy claws, and they can swallow muscles, crabs, &c. sucking out the fish, and ejecting the shells. Through this opening they produce perfect young ones, which, as soon as they affix themselves, extend their claws in search of food.

THE RICINUS, OR CASTOR-OIL TREE.

This tree is also known by the name of *palma christi*. It grows to its full height in a single year, being from fifteen to twenty feet. It yields a yellow blossom, and produces triangular and prickly capsules, each containing three seeds, from which castor-oil is obtained, from expression or decoction, but the latter method produces the best oil. It is used in medicine as a mild purgative; but it answers exceedingly well for burning and painting, for which latter purpose it is used in America.

BEATING PTINUS, OR THE DEATH-WATCH.

This small insect is remarkable for its structure, which is exhibited in a magnified form, as well as of the natural size; the male specimen having wings. Superstition has attached a ridiculous importance to the unexplained beatings of the forehead of the male insect, and hence its name. If faith of this kind is entertained, these noises may actually kill some hypochondriacs; but the original idea must have sprung from some of those coincidences which often deceive the unthinking. If the average of human life is taken at thirty-five years, in a family of seven, one death must take place every five years, and, in a family of fourteen, every two years and a half: hence, if these insects harbour in any house, their noises must necessarily precede some death, though they have no other connexion with the death than any other circumstance.

THE MEDUSA.

The body of this animal is gelatinous, and the mouth is in the centre of the under part of the body. Many species, on being handled, affect with a nettle-like burning, and excite a redness: hence they are called sea-nettles, or medusæ. Their varied figure renders it difficult to assign them any determinate one; yet they mostly resemble a truncated cone, whose base is applied to the rock to which they adhere. Their colours are whitish brown, red, or green; the mouth is very large, and, when opened, appears surrounded with filaments resembling the horns of snails; which, being disposed around in three rows, give the animal the appearance of a flower; and through every one the animal can squirt the sea-water. These animals swim in large companies in search of food, with their tentacula in continual motion. They vary in size, the largest being generally about eight inches in diameter; they extend their filaments, and quickly entangle any small animals that come within their reach.

BUTTERFLIES.

The beauties of this elegant part of the creation are well known, and few can contemplate them without astonishment. The caterpillar informs us how it prepares for the lethargic sleep, the transition to its metamorphosis; the chrysalis being at once the tomb of the caterpillar and the cradle of the butterfly. Within a silken cell, or under a transparent veil, is this great miracle of nature daily wrought. But minute descriptions of various species of butterflies are tedious and uninteresting. In the engravings are given seven different species, in their three different states of grub, chrysalis, and fly; an inspection of which will teach more than several pages of verbal description.

In truth, there are no less than 273 species distinguished by the colour of their wings. The genus is characterized by four wings, body hairy, and the antennæ thicker towards the extremity, terminated by a head; while the wings, when setting, are erect, and touch one another above the body. In general, two generations of these insects pass through their three stages of caterpillar, chrysalis, and butterfly, in a season, but one very small species through these states ten times in a year, making ten generations, which would create an enormous increase if not checked by other causes. Barbut has divided papilios into five sections: 1, the Equites, or riders; 2, Heliconians; 3, the Danai; 4, the Nymphals; and 5, the Plebeians.

The following varieties of butterflies have been found near Epping, a situation highly favourable, owing to its vicinity to an extensive forest; and probably, therefore, affording as great a variety as any single situation in England.

- Papilio Antiopa*, Camberwell beauty. Very rare.
P. Polydora, elm tortoise-shell. Rare.
P. Urtica, common tortoise-shell. Very common.
P. Io, peacock. Common.
P. Atalanta, scarlet admirable. Common.
P. C. Album, coma. Rare.
P. Cardui, painted lady. This was not uncommon in the year 1818, but has not been seen since.
P. Adippe, violet silver-spot, fratillary. Rare.
P. Paphia, silver-streak, fratillary. Common.
P. Euphrosyne, April. Common.
P. Euphrasia, May.
P. Janira, male } Meadow-brown.
P. Jurtina, female } Very common.
P. Aegeria, wood-argus. Common.
P. Hyperantus, ringlet. Common.
P. Megæra, wall-argus. Common.
P. Tithones, great gate-keeper. Common.
P. Pamphilus, small. Common.
P. Galatea, marbled argus. Common.
P. Brassicæ, large garden, white. Very common.
P. Rapæ, small ditto.
P. Napi, green veined.
P. Sinapis, wood ditto. Common.
P. Cardamines, orange-lip. Common.
P. Rhamni, brimstone-yellow. Common.
P. Argiolus, wood-blue. Rare.
P. Icarus, common blue. Common.
P. Machaon, common swallow-tail. Rare.
P. Electra, clouded yellow. Very rare.
P. Tages, dingy skipper. Not uncommon.
P. Thaumus, small skipper. Common.
P. Sylvanus, large skipper.
P. Idas, brown-blue. Not uncommon.
P. Phleas, small copper. Common.
P. Belulæ, brown hair-streak. Rare.
P. Quercus, purple hair-streak. Rare.
P. Rubi, green hair-streak. Rare.
P. Malvæ, spotted skipper. Common.

THE BAT.

The bat's nocturnal flight, with its general appearance, excites the idea of something hideous and dismal; and the larger animals of this species, in India and Africa, correspond with the description of the ancient fabulous harpies. The two most common species of bat in this country are the

common and long-eared bat; the former of which, represented in this engraving, is about the size of a mouse, and the extent of the wings, fully expanded, about nine inches. It never ventures abroad by daylight, or in rainy weather; but, when winter sets in, it becomes torpid, and remains till the return of spring.

THE VAMPYRE, OR SPECTRE OF GUIANA,

Called also the Flying Dog of New Spain, is a bat of monstrous size, which sucks the blood of men and cattle while asleep. It usually attacks the victim at the feet, by sucking the blood through a small orifice scarcely discernible. They generally bite cattle in the ear, but always in places where the blood flows spontaneously.

THE FLY.

The genus *Musca* is distinguished by transparent and naked wings, and the not having the powder which distinguishes the wings of butterflies, nor the cases or covers which distinguishes the beetle tribe. The parts are the head, the body, and corcelet, to which the wings are affixed, and to which the head is joined; and is the strongest and thickest part of the insect. The *formica leo* and some water-insects turn into flies, which have double corcelets; and flies themselves are divided into two classes, one having two wings, and others having four. Some have a trunk, and others have a mouth, from which they receive nourishment.

THE MUSQUITOE.

The knat of hot climates, where they exist in numbers, which almost darken the air, and subsist on the blood and juices of animals, which they suck by means of a sharp proboscis, and render life almost insupportable by their incessant attacks. In the larva state they exist in stagnant waters, as will be seen by the engraving. They are small in bulk, but powerful in their united numbers.

NATURE DISPLAYED.

BRITISH ANIMALS.

THE point of rural economy in which the British nation excels, is the breeding of domestic animals; every species of which are brought to a degree of excellence scarcely elsewhere met with. There are twenty genera of animals indigenous to Britain, from the horse down to the seal and bat. Of these we will take a special survey, because of their superior interest.

That noble and useful animal, the HORSE, is found in England of many mingled breeds, while other kingdoms mostly produce one kind only. Our race-horses descend from Arabian stallions, and the genealogy faintly extends to our hunters. Our draught-horses, of great strength and size, are derived from those of Germany, Flanders, and Holstein; and the breeds are so intermingled, that native horses may be found adapted to every purpose of pomp, pleasure, or utility. Those of Yorkshire are celebrated for their spirit and beauty; and the grooms of that county are equally noted for their skill in managing this valuable animal.

The speed of the flying Childers was computed at a mile in a minute; and such is the strength of a Yorkshire pack-horse, that he will usually carry four hundred and twenty pounds; indeed a mill-horse will support, for a short distance, a weight of nine hundred and ten pounds! The British cavalry horses were remarkable even in the time of Julius Cæsar, but we are ignorant of their primitive breed.

The indigenous breed of HORNED CATTLE exist now only in Needwood Forest, Staffordshire, and at Chillingham Castle, Northumberland. They are long-legged and wild, like deer; of a white colour, with black muzzles, ears, tails, and a black stripe along the back.

The breeds of our cattle are as various as of our horses; those of Wales and Cornwall are small: while the Lincolnshire kind derive their great size from those of Holstein. In the north of England we find *kyloes*, so called from the district of Kyle, in Scotland; in the south, we find the elegant Guernsey breed, of a light brown colour, and small size, but remarkable for their rich milk. Mr. Bakewell, and others, have recently brought the breeding of cattle and sheep to a regular system.

The number and value of SHEEP in England may be judged from the ancient staple commodity of wool. Of this most useful animal, the several breeds are herein described; those of Herefordshire, Devonshire, and the Cotswold Downs, are noted for fine fleeces; those of Lincolnshire and Warwickshire, for the quantity. The Teesdale breed, Durham, though lately neglected, continue to deserve their fame. The mutton of Wales is much esteemed; the wool, though coarse, is yet useful in many manufactures. The Norfolk breed is remarkable for black faces and legs. Those of Leicestershire are very large, and without horns.

The GOAT, an inhabitant of the rocks, now, even in Wales, yields to the more useful sheep; that country being, like Scotland, more adapted to the woollen manufacture.

The breeds of SWINE, various and useful, are distinctly enumerated here, with some hints for their better management.

Some of our breed of DOGS were celebrated even in Roman times. In Elizabeth's reign Dr. Caius enumerates sixteen denominations. Some seem now extinct, and the blood-hound occurs only in Staffordshire. The terrier is used to force the burrowing animals from their holes; the harrier, akin to the fox-hound, for hunting the hare. The greyhound was so called, as Caius informs us, because he was the first in degree among dogs. The tumbler of that author seems to be our lurcher.

The spaniels, from Spain, were trained as starters, setters, and pointers, but the latter description is modern; the water-spaniel was used to recover the slaughtered game; the spaniel gentle, (comforter of Dr. Caius,) is

our lap-dog;—the shepherd's dog always displayed its docile qualities. The mastiff was employed in defending the house : to this species, Pennant ascribes the bulldog, an animal of surprising spirit and fierceness. The curs and mongrels are numerous, but the turnspit is now exploded. The Newfoundland dog, of more useful and generous qualities, has in some degree supplanted the mastiff, and the spotted Dalmatian forms an additional attendant on our equipages.

The CAT is one of the most universal and most similar of animals : except those of Angola, with their white fleeces ; and those of Russia, with a bluish fleece, and eyes of topaz.

Of our SAVAGE ANIMALS, the most fierce and destructive is the WILD CAT, found only in the most mountainous and woody parts. The Wolf has been long extinct, but the Fox abounds. It is sufficient to name the BADGER, FITCHET, MARTIN, STOAT, OTTER, SQUIRREL, DORMOUSE, RAT, and various kinds of MICE. The MOLE, URCHIN, and BAT, are become more rare : the SEAL is found on the Scottish, Welch, and English coasts.

Of our wild DEER, formerly abundant in the woody and mountainous districts, scarcely any are left in the southern parts ; but the red-deer, and roe-buck, still run in the forests of the Scottish Highlands. The fallow-deer are confined to parks, of which many belonging to the nobility and gentry, contribute to beautify the face of the country.

DEER.

AFTER the establishment of the heptarchy, each sovereign reserved chases for his own particular amusement ; but, as only waste lands were thus appropriated, no individual suffered injury from the restraint. The Norman kings, however, carried the passion for hunting to excess, and every civil right was invaded. Even in a superstitious age, the ardour for hunting superseded religious considerations ; entire villages were destroyed, sacred edifices thrown down, and the country turned into one extensive waste.

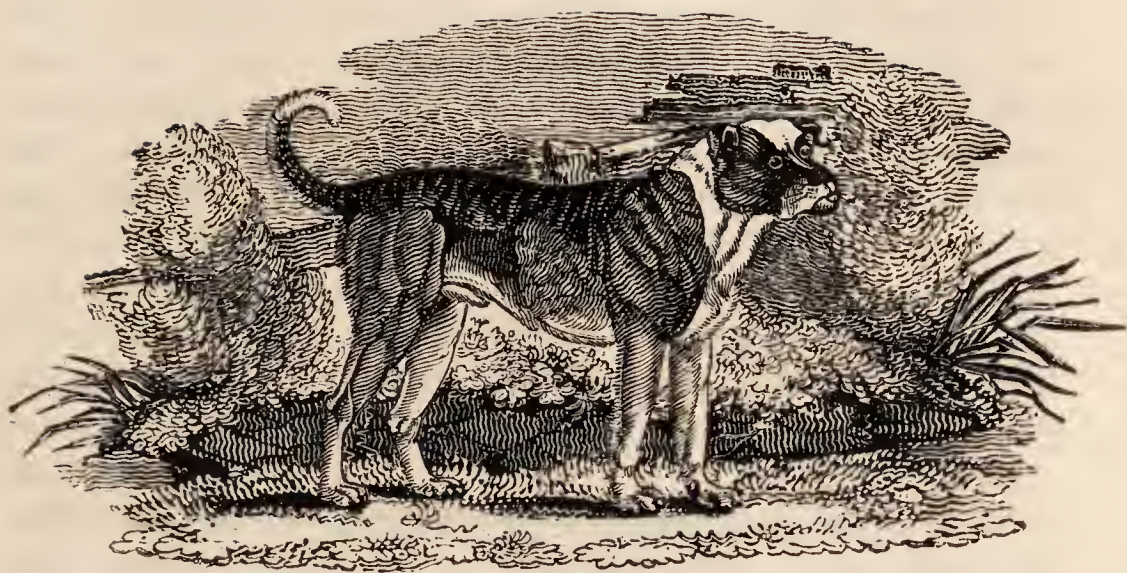
As agriculture and the useful arts increased, vast tracts of land, before appropriated to hunting, became occupied by animals more useful to the community : few chases now remain, and deer are almost confined to parks, of which England can boast more than any other kingdom in Europe ; having nearly eight hundred ; besides sixty-nine forests ; of which the four principal are, New Forest, Hampshire ; Sherwood Forest, Nottinghamshire ; Dean Forest, Gloucestershire ; and Windsor Forest, Buckinghamshire.

Forest deer, though pasturing at large, seldom stray far from the walk where they are bred : and the keeper, who always wishes to prevent his own deer from travelling into the limits of their neighbours, encourages their fondness for home, by feeding them, in winter, with holly, and other plants which they like ; and browsing them, in summer, with the spray of ash ; making, when he distributes his dole, a hollowing noise, to call his dispersed family together. In calm summer evenings, near a lodge, this noise may be heard resounding through the woods ; and a listener, not apprised of it, will wonder at its periodical exactness each evening. Deer feed generally at night, or at early dawn, and retire in the day to the shelter of the woods ; their morning retreat is thus beautifully described by the poet :

The day pours in apace,
And opens all the lawny prospect wide ;
The hazy woods, the mountain's misty top,
Swell on the sight : while o'er the forest glade
The wild deer trip ; and often turning, gaze
At early passengers.

The uses to which the skin of the buck and the doe is applied are well known ; the horns of the stag, being compact, hard, and weighty, are useful in mechanics, and, in common with deer's horns, make excellent handles for knives, and other implements. They also abound in the salt which is the basis of the spirit of hartshorn ; and, after the salts are extracted, the residue being calcined, is a valuable astringent in fluxes, known as burnt hartshorn.

Only very recently have deer been considered an object of husbandry ; a practice first adopted by the Earl of Clarendon. As soon as the rutting season is



The Bull Dog.



The Fallow Deer.

over, (or about the tenth of November,) his lordship selects those deer which are weak, and would probably die in the winter, and keeps them in a small warm and sheltered yard, which has a shed on one side, and a net over the whole against pigeons, &c. Their horns are immediately sawn off; the place is well littered, and they are fed (at a very small expense) on pea, straw, hay, &c. the warmth supplying the place of better food. At times, during the winter, they have cut clover hay, and when they do not eat it well, a little salt is added. They have always a sufficiency of water, and are kept clean; the keeper carefully making himself familiar with them, that he may enter the place without disturbing them.

STAGS, mostly termed red-deer, are supposed to have been originally introduced from France. This beautiful animal is still found wild in the highlands of Scotland, Cumberland, the forest of Exmoor, and the woods on the banks of the Tamar. In Ireland, among the mountains of Kerry, stags enhance the magnificent and romantic scenery of Killarney.

The stag differs from the fallow-deer, both in magnitude and conformation of its horns; being much larger, and his horns being round, while theirs are broad and palmated. The first year the stag has no proper horns, but only a corneous excrescence, short, rough, and covered with a thin hairy skin: the second year, the horns are single and straight; the third year, they have two antlers; the fourth, three; the fifth, four; and the sixth, five. The sixth year, the antlers do not always increase; and though each side may have six or seven in number, the stag's age is less estimated from that than from their size, and the thickness of the branch which sustains them.

These horns, notwithstanding their magnitude, are shed annually, and succeeded by new ones. At first, nothing can be more tender or soft; and the creature, as if conscious of its imbecility, after shedding its former horns, retires from the herd, and, concealed in solitudes and thickets, only ventures out for pasture in the night. During this interval, about the latter end of February, and the beginning of March, the new horns occasion considerable irritation to the animal.

When the old horns are shed, the new ones do not immediately appear; but the skull bones are invested with only a transparent skin, which soon becomes tumid, forms an excrescence containing much blood, and gradually appears covered with a downy substance, as soft as velvet, and of similar colour with the animal's hair. This tumour daily protrudes like a tree graft, and, rising gradually from the head, according to the condition of the animal, shoots out the antlers on each side, so that in a few days the whole head is completed. For some time, however, the horns are soft, and covered with a sort of bark, merely a continuation of the integument of the skull. This bark is like velvet and down, every where furnished with blood-vessels, which supply nourishment; as they creep along the sides of the branches, their prints mark the whole surface; in depth according to their size. Hence the inequalities on the surfaces of deer-horns, furrowed all along the sides, diminishing towards the points, where the parts are as smooth and solid as ivory. When the whole head has attained its full growth, the extremities acquire solidity; the velvety covering, with the blood-vessels, dry up, and begin to fall; which process the animal accelerates, by rubbing its antlers against every tree nigh; and thus, being at length stripped off, the head acquires its complete hardness, expansion, and beauty.

If a stag be cut before it has attained its horns, they will not afterwards be produced; but if performed when its horns are in perfection, it will always retain these ornaments. Slender and insufficient nourishment retards the growth of horns. When stags have cast their horns they separate and quit the open parts, continuing among coppices until the horns are renewed. About the end of August, or beginning of September, they return to the plains in search of the females, whom they court with a loud tremulous voice. Their necks are now remarkably turgid; they appear bold and furious; fly from one place to another; strike their horns against the trees, and every other opposing object, and continue restless and fierce till they have found the hinds.

In general the stag is harmless and inoffensive, but when engaged in his seraglio, he may be heard roaring and bellowing, meditating revenge on his rival, whom he

meets head to head and foot to foot ; whilst able with his antlers to parry the attack, he stands his ground ; and when of equal prowess, the conflict is obstinate. But a weak adversary soon feels the strength of his opponent. He cannot resist his push ; his flanks give way ; and he is presently driven off the field. On these occasions the old stags are generally successful, as they possess more strength and courage than the young ones. This period lasts about three weeks, during which the stag scarcely eats, sleeps, or rests, and though before very fat, sleek, and glossy, he is, at the end of this season, lean, feeble, and timid ; he now retires from the herd, to seek food and repose ; he frequents the verge of his bounds ; selecting and remaining in the most nourishing pastures, till his strength is renovated.

The longevity of the stag, (proverbial among the ancients,) is a vulgar error : his age may be forty years, on the principle that animals live seven times the number of years that bring them to perfection, as this requires six to arrive at maturity.

The colour of the English stag is a reddish brown, with some black about the face, and a black list down the hind part of the neck, and between the shoulders. His eye is the most beautiful of any animal, of this climate ; and his senses of smelling and hearing are not less perfect. When alarmed, he lifts his head, erects his ears, and stands a few moments, as if listening. Whenever he ventures on some unknown ground, or quits his native covert, he pauses at the skirt of the plain, to examine every object around him ; after which he turns his face to the wind, to discover by his scent the approach of an enemy. If a distant person whistle, or call aloud, he immediately stops short in his slow-measured pace, and gazes on the intruder with a kind of awkward admiration ; but, if he perceive neither dogs, nor instruments of destruction levelled against him, he proceeds forward without betraying the least fear.

The stag eats with deliberation, and is very delicate in choosing his pasture ; and, when he has satisfied the calls of nature, he retires to some thicket, to chew the cud in security. This act he performs with less ease than either the cow or the sheep ; for the grass is returned from the first stomach with much effort, and a

kind of hiccup is very perceptible during its continuance. This animal seldom drinks in winter, and still less in spring, while the plants are tender, and covered with the morning dew; but, in the heat of summer, he constantly frequents rivers and lakes, as well to allay his thirst as to cool his ardour. He swims strongly with ease, particularly when in good condition. His voice is stronger, louder, and more tremulous, as he advances in age; and is sometimes even terrible. The cry of the hind, or female, is weaker than that of the male, and is only excited through apprehensions for the safety of either herself or her young; and it may be added she is destitute of horns, and more feeble and unfit for hunting than the male. The time of gestation is between eight and nine months; and she seldom produces more than one at a time.

About May, or the beginning of June, is the usual season of parturition, during which these creatures assiduously conceal their young in the most obscure retreats; a necessary precaution, as they have to fear the attacks of most other animals. The stag himself being also their avowed enemy, the hind exerts all her industry to conceal her young from him, as one of their most dangerous assailants. At this season, the courage of the male seems transferred to the female; for, by force, she defends her offspring against her less formidable opponents; her fore feet are her weapons of offence, and she has been known to strike a dog so violently with their spring, as to strip his skin from his flesh, and lay his side bare.

Of the wonderful leaps taken by the stag, when cruelly and closely pursued, Mr. Gilpin mentions the following, which took place in New Forest: "In our way to Hounds-down, we rode past a spot, called the Deer-leap. Here a poor stag was once shot; which, in the agony of death, collecting his force, gave a bound which astonished all who saw it. It was immediately commemorated by two posts, fixed at extremities, where they remain. The space between them is somewhat more than eighteen yards."

A stag, during his first year, is called a *calf*; and does not assume the name of a stag till his fifth; being known in the interim by certain technical names, which

we consign to the memory of foresters. In his sixth year, he takes the title of a *hart*. Besides this, he may still attain two higher degrees, *hart-royal*, and a *hart-royal proclaimed*.

If he be hunted by the king, and escape; or have his life spared for the sport he has afforded; he becomes from that time a *hart-royal*. If he be hunted out of the forest, and there escape, the king has sometimes honoured him with a royal proclamation; forbidding any one to molest him, that he may have free liberty of returning to his forest. From that time he becomes a *hart-royal proclaimed*.

The stag might, like the rein-deer of Lapland, be easily trained to draw a carriage, had we not animals more suitable for the purpose. The late Earl of Orford possessed two deer, which being manageable by domestication were bitted, and drew a light curricule with great ease and expedition. In France and Germany, deer have submitted to be harnessed; in the latter country, six of these animals have been quite tractable to the bit and whip.

No country produces FALLOW DEER in quantities equal to England; and in other countries they are wild, and not subjected to human dominion. This animal is nearly allied to the stag; alike in shape, disposition, fleetness, timidity, and the superb furniture of their heads, it might be conjectured that they associated, and yet no two animals avoid each other with more rooted aversion.

Fallow Deer are smaller, and less robust and savage, than the stag. They are of a reddish-brown colour, and spotted with white, with a large branching head, and were first introduced from Bengal. The deep brown sort, seen in many parts, were first brought from Norway by James I. They are bred in parks, either for hunting or luxury; their flesh being preferable to that of any other animal. Their horns are broad and palmated at the extremities, pointing a little forward, and branched on the hinder sides; they have two sharp and slender brow antlers; and above, two small slender branches; whereas, the horns of the stag are round in every part: in the one animal, they are flat, like the palm of the hand; in the other, they are like a tree, every branch being shaped

like the stem which supports it. The colour of the fallow-deer varies more than that of the stag, and its tail is longer; but, in other respects, the affinity is very close. A variety of the fallow-deer is now found in many of our parks.

Foresters apply various technical names to the fallow deer. The young one, in his first year, is called a *fawn*; in his second, a *pricket*; in his third, a *sorel*; in his fourth, a *sore*; and in his fifth he takes the name of a *buck*. The female, in her first year, is called a *fawn*; in her second, a *teg*; and afterwards, a *doe*.

The ROE was formerly common in Wales and the northern parts of England; but, at present, the species exists only in the highlands of Scotland. The roe-buck is of the least kind of deer, being only about three feet long, and two and a half high. The horns are six or eight inches, erect, round, and divided into three branches; the body is covered with long hair, well adapted to mountainous retreats, the lower part cinereous, with a narrow stripe of black near the extremities; and the points yellow. The hair on the face is black, tipped with ash colour; the ears are long, the inside of a pale yellow, covered with long hair; the chest, belly, legs, and insides of the thighs, are a yellowish-white; the rump is perfectly white; and the tail is about an inch long. The whole figure is very elegant, and its fleetness is equal to its beauty. It differs from the fallow-deer, in having round horns; from the stag, in its small size and the proportionable paucity of its antlers; and from every animal of the goat kind, in annually shedding its horns.

The growth of the roe-buck, until maturity, is more rapid than that of the stag, but his life is proportionally curtailed. He seldom lives more than twelve or fifteen years; and, in a state of domestic servitude, his existence is abridged to seven or eight. Being very delicate, he requires variety of food, air, and exercise; he must also be paired with a female, and kept in a park of considerable extent. The roe-buck can easily be subdued, but never perfectly tamed; it always retains some of its natural wildness; and no arts can teach it familiarity with its feeder, much less any attachment to him.



The Hedge Hog.



The Otter.

THE BADGER.

THOUGH speed and activity are denied to the badger, yet nature furnishes it with most excellent offensive weapons ; few animals bite harder, or defend themselves more obstinately. The badger is inoffensive, feeding on roots, fruits, grass, insects, and frogs ; neither does he destroy rabbits and lambs, as usually reported ; though very tenacious of life, a small blow on the snout will prove mortal.

The common badger (*ursus meles*) is found in the most wild and unclosed parts of Great Britain and Ireland. It has small eyes, short ears, a short thick neck, and very short and thick legs. The nose, chin, part of the cheeks, and the middle of the forehead, are white ; the ears and eyes are encircled with a pyramidal black bead ; the hair on the tail, (about six inches long) ; the body is long and rough, of a yellowish-white at the roots, black in the middle, and cinereous at the points ; the throat, breast, and belly, are black. Its length is two feet six inches, from the nose to the insertion of the tail ; and its weight from twenty to thirty pounds. Immediately beneath the tail, is a narrow transverse orifice, a sort of pouch, which exudes a white fetid substance. Its greatest age is from eight to twelve years.

In walking, the badger treads on its whole heel like the bear ; and its legs being short, its belly is near the ground ; and the length of its hair makes the creature appear larger than its real bulk ; he seeks the most sequestered places, where he assiduously digs a deep hole for refuge. He seems averse to the light, and seldom quits his retreat till the night, when he steals from his subterraneous abode, to procure subsistence. The legs being short and strong, and the claws stiff and horny, he burrows in the ground with great facility ; and, throwing the earth behind him to a great distance, he forms a long winding cavern, at the bottom of which he remains in security. The fox, less expert in digging, often avails himself of the labours of the badger, drives him away, and takes up his abode in the prepared den.

When the badger is surprised by dogs at a distance

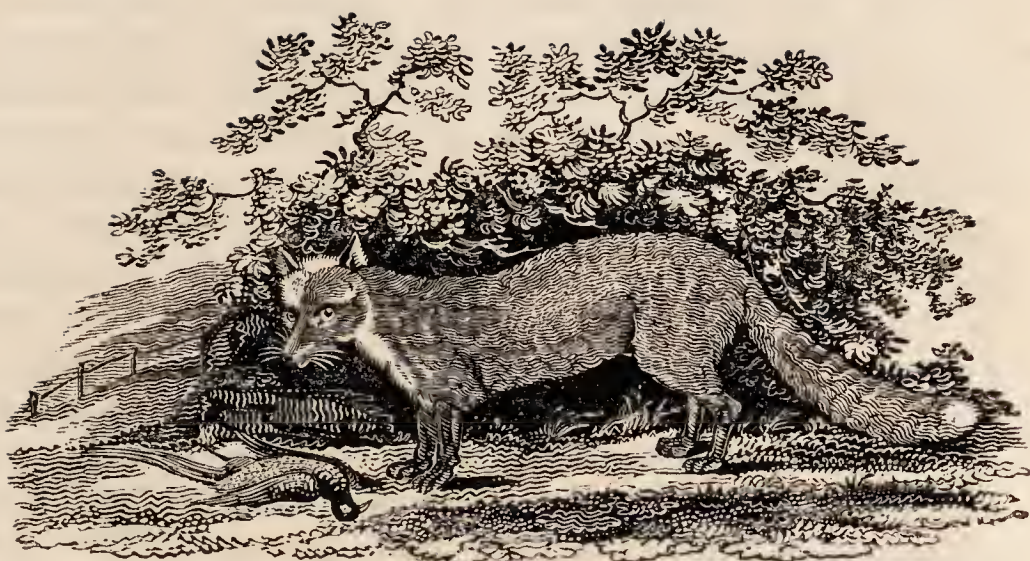
from his hole, he combats them desperately, falling on his back, and so defending himself to the last extremity. He is very cleanly, and as he sleeps most of his time, so, without a voracious appetite, he always appears fat and plump, particularly in winter. The female breeds in summer, and produces three or four at a time, which she first nourishes with her own milk, and then habituates them to such other food as she can procure. Though old badgers remain savage and untractable, young ones are easily tamed, to play with the dogs, and follow their owners, like other domestic animals. Being of a chilly nature, they are remarkably attached to a warm fire; to which they often approach so close, as to burn their feet, which do not readily heal. No animal is more cruelly treated by the low and vulgar than these unfortunate and proscribed animals.

THE FOX.

THIS lively and crafty animal, like the wolf, appears generally diffused through all the northern and temperate parts of the globe; occurring, with varieties of colour, and size, in most parts of Europe, the north of Asia, and America. In the north, are foxes of all colours; black, blue, grey, iron colour, silver-grey, white with yellow feet, white with black heads, white with the extremity of the tail black, reddish with the throat and belly entirely white, and some have a black line along the back, crossed with another over the shoulders: the latter are larger than the other kinds, and have black throats. Some of these, however, are now regarded as perfectly distinct species.

The fox, either by industry or violence, prepares for himself a convenient den or receptacle, wherein he lies concealed most of the day; it is contrived to afford the best security to the inhabitant, by being situated under hard ground, the roots of trees, &c., and also furnished with proper outlets, through which he may escape in case of necessity.

He attempts his prey rather by cunning than by force: his scent is so exquisite, that he can perceive either prey or enemies at two or three hundred paces distance. Without opposing dogs or shepherds, without attacking the flock, or alarming the village, he finds an easier way



The Fox.



The Cur Fox.

of subsistence, and gains by address what is denied to his strength or courage. Prudent, patient, and vigilant, he waits the opportunity of depredation, varying his conduct with the occasion. In clear warm weather, he sometimes comes to bask in the sunshine, lying stretched out on some dry place, or near the stump of a tree. He is in motion the whole night in search of prey.

The fox keeps his kennel mostly at the edge of a wood, within an easy journey of some farm-house, or cottage: there he listens to the crowing and cackling of domestic fowls; he scents them at a distance; he seizes his opportunity, conceals his approaches, creeps slyly along, attacks his prey, and seldom returns without booty. When he gets into the farm-yard unmolested, he begins to dispatch all the poultry without remorse; and, carrying off a part of the spoil, conceals it at some convenient distance, and then returns to the charge; thus he brings them one by one, thrusts them into the earth with his nose; and afterwards, at leisure, covers them with loose earth, where they remain till hunger stimulates him to another visit. The same arts are practised when he finds birds entangled in springes laid by the fowler: he expertly liberates them from the snares, hides them a few days, *and knows exactly when and where to avail himself of this buried treasure.* He is equally alert in seizing young hares and rabbits, before they have sufficient strength to escape from him; and, when the old ones are wounded, or fatigued, he seldom fails discovering them in their moments of distress, and rendering them his prey. He also seeks birds' nests; seizes the partridge while sitting; and destroys much game.

This rapacious animal makes considerable havoc among field mice; with which, like the cat, he plays for some time, before he devours them. He occasionally eats frogs, newts, snails, and insects. Several kinds of berries and fruit are also acceptable; he is particularly fond of grapes, and often injures vineyards. Even the poor hedge-hog in vain rolls itself up in a ball, to oppose him; the determined plunderer never desists teasing the poor animal, till it is obliged to extend itself, when he instantly devours it. Wasps and wild bees are attacked with equal success: though they fly

out on their invader, and at first actually oblige him to retire; their triumph is short; for, rolling himself on the ground, he crushes those which stick to his skin, and then, by perseverance and repetition of this same expedient, he compels them to abandon their combs, and eagerly devours both wax and honey.

Of the common fox (*canis vulpes*) our three varieties are, the *greyhound fox*, (in Wales, *milgi*,) the largest, tallest, and boldest, will attack a grown sheep; the *mastiff fox*, less, but stronger built; and, the *cur fox*, or *corgi*, the kind before mentioned, with a black tip to the tail; (probably the *canis alopex* of Linnæus.)

The fox has a broad head, sharp snout, flat forehead, obliquely seated hazel-coloured eyes, very brilliant and expressive; sharp erect ears, a body well covered with brownish red hair, and a straight, bushy, and somewhat pointed tail, tipped with white; this he frequently endeavours to catch, as he turns round; and in cold weather wraps it round his nose.

The smell of the fox is proverbially offensive, supposed to resemble that of the root of the crown-imperial (*fritillaria imperialis*); but more accurate observation attributes this singular property to the herb robert (*geranium robertanum*), so common on dry banks and under hedges.

The fox produces five or six young at a time (about March,) breeding only once a year, unless an accident happens to the first litter. When they are discovered, or disturbed, the female will carry them, in her mouth, one at a time, to a more secret retreat; thus imitating the cat and dog. The cubs are brought forth blind, (like puppies,) are of the darkest brown colour, grow for eighteen months, and live thirteen or fourteen years.

The cry of the fox is a sharp, quick yell, ending in a higher, stronger, and screaming kind of note, like that of the peacock. In winter, during frost and snow, he yelps much, but in summer is mostly silent. His skin, furnished with a soft and warm fur, is much used for muffs and linings for clothes. At Lausanne are furriers who possess between two and three thousand fox-skins, taken in one winter. The fur of the black fox is, in Russia, esteemed above the finest sable, a single skin selling for four hundred rubles. The inhabitants of

some parts of the continent eat the flesh during the winter season.

Fox-hunting is no where pursued with such ardour and intrepidity by the unfeeling, as in Great Britain; our dogs and foxes being confessedly superior to those of any other country. The instant a fox finds himself pursued, he flies towards his hole, and finding it stopped, (which is always carefully done before the hunt begins,) he has recourse to his cunning and speed for safety. If the fox, however, during the chase, *runs to ground*, a little terrier, (usually associated with men in the sport,) boldly ventures into his den to rouse him, and prevent his burrowing deeper in the earth.

At the Golden Bear Inn, in Reading, a few years since, a fox had been taught to be in a wheel, and turn the jack: but, after some time, he escaped, and regained his native woods, where he met the fate common to his species; being pursued by the hounds, in his flight he ran through the town of Reading, and, springing over the half-door of the kitchen, jumped into the wheel and resumed his occupation, and thus saved his life, in the place where he had formerly been brought up. A Mr. Salter, of Rickmansworth, had, in 1805, a fox that lay constantly in the kennel with his harriers; he was complete master of the feeding-yard, and would not suffer a hound to eat near him until he had satisfied himself.

THE DOMESTIC CAT.

THE cat has long been under the protection of man, and its manners are much changed by education; yet it is often capricious in its resentments, and though capable of attachment, its fidelity is not to be relied on; as an inadvertent tread on its tail, cancels the obligations of years. Active, cleanly, delicate, and voluptuous, the cat is fond of ease, and always chooses the softest beds. Its natural disposition is less mild and generous than that of the dog; and when offended it will often boldly stand forward in its own defence.

Cats possess the singular property of alighting on their feet whenever they fall. Though not able to see objects in perfect darkness, yet they can perceive them with less light than other animals; the pupils of the eye contracting or dilating, according to the degree of

light by which they are effected. Nothing can be more beautiful (says Dr. Shaw) than the experiment of first setting a young cat before a looking-glass. The animal appears surprised and pleased with the resemblance, make several attempts to touch its new acquaintance; and, at length, finding its efforts fruitless, it looks behind the glass, and appears surprised at the absence of the figure: it again views itself; tries to touch with its foot: suddenly looking, at intervals, behind the glass: it then becomes more accurate in its observations, and begins to make experiments, by stretching out its head, in different directions; and when it finds these motions answered in every respect by the figure in the glass, it seems, at length, convinced of the real nature of the image. The same is the case with the dog at an early age.

Of the domestic cat (*felis catus domesticus*) the females vary much in colour; some are entirely black, others black and white, and others (tortoise-shell cats) are black, fulvous, and white. Many other variations also occur; but most of the males are marked with grey stripes. A tortoise-shell male cat being esteemed a great rarity, has fetched a large sum.

The cat goes fifty-six days with young, and produces five or six at a time, twice or thrice in a year; she conceals her kittens from the male, lest he should devour them, as he is sometimes inclined; and, if apprehensive of being disturbed, she will take them up in her mouth, and remove them one by one to a more secure retreat. The female herself is sometimes known to eat her own young immediately after she has brought them forth; but, in general, she is remarkable for maternal tenderness; she feeds and suckles them with extreme solicitude; and when they have strength enough to digest animal food, she catches and brings to them mice and small birds. When they are old enough to follow her, she introduces them to the family in which she resides, and seems to bespeak protection for them. Cats too are often much affected by the loss of their kittens, and will pine after them, and refuse food for a long time.

But not only to her own offspring will the cat show kindness. In discharging maternal duties, if her own young are destroyed or removed, she will rear a suppo-



The Cat.



Cat and its prey.

sitious brood. Mr. White mentions an instance of a cat bringing up a leveret, three young squirrels, and even of being attached to a rat, accidentally thrown under her protection. And even more extraordinary, a reciprocal affection has been remarked between a cat and a pigeon; they were first observed together on the wall of a garden belonging to a gentleman at Putney; the pigeon was afterwards domesticated; and they continued from that time inseparable companions.

Cats are naturally averse to water, and are particularly cautious of wetting their feet; yet, so partial are they to fish, that one has been seen to plunge into a stream after a trout, and to lie in wait by the sides of ponds in expectation of its favourite food. Though the mouse is the cat's favourite game, she will prey on rats, birds, bats, young hares, rabbits, or whatever she can seize.

Blades of grass are eaten by the cat as well as by the dog: the former is very fond of valerian, and cat-thyme, (*teucrium marum*); frequently rubbing itself against these plants, and exhibiting every sign of rapturous intoxication. It is very difficult to poison the cat; arsenic, corrosive sublimate, and other substances having totally failed. Cats soon become old, and ten or twelve years form the limit of their existence. One has been known to subsist twenty-four days without food; and its proverbial character for tenacity of life, subjects it to incredible cruelties. The cat is so particularly attached to the place where brought up, that, if carried elsewhere, it will often return to its old habitation, though at many miles distant. A singular instance of this sort, is mentioned by Mr. Daniel. In 1810, a cat was carried in a close carriage by a lady from Edinburgh to Glasgow, and was carefully watched two months; at the end of which period, having produced two kittens, she was left to her own discretion, which she employed by disappearing with her kittens. The Glasgow lady wrote to her friend at Edinburgh, deploring her loss; and Puss was supposed to have sought some new abode; until, about a fortnight after her non-appearance at Glasgow, her well-known mew was heard at the door of her former mistress in Edinburgh, where she was discovered with her young offspring; they in the best condition, and she very thin and poor. The distance from

Edinburgh to Glasgow is forty miles ; and as she could only have carried one kitten at a time, so, in returning, she must have travelled one hundred and twenty ; and her prudence must have suggested the mode of travelling in the night, with many other circumstances, for the safety of her kittens. When she was admitted to the door of her old habitation, she brought one kitten up in her mouth, and deposited it in that corner of the drawing-room she always occupied ; then returned for the second, and afterwards seated herself very composedly, without particular noticing any of the company present.

Mohammed was exceedingly fond of this animal ; and, it is related, that being called up on some urgent business, he preferred cutting off the sleeve of his robe, to waking the cat that lay upon it.

A writer in the Gentleman's Magazine affirms, that he had seen a cat attempt *suicide*, by repeatedly throwing itself head-foremost, from a high shelf on a stone-floor ; and, though it did not accomplish its purpose, yet it was bruised so much, that it was thought humane to drown it. This highly curious and interesting circumstance will scarcely obtain belief, except among persons conversant with the facts and phenomena of natural history.*

The Angora cat, a native of Egypt, is a most singular and beautiful variety ; one is thus described : Long and silky hairs cover it entirely ; its thick tail forms a magnificent plume, which the animal elevates at pleasure, above its body. Not one spot, or shade, tarnishes the dazzling white of its coat. Its nose, and the turn of its lips, are of a tender rose colour. Two large eyes sparkle in its rounded head, one a light yellow, and the other blue. This beautiful cat had still more of amiability than of grace in its movements and in its

* " In some animals, love of liberty is the ruling passion ; some are easily trained, and submit readily without opposition. Examples of the latter are common : of the former take this instance ; a brood of stone chatters, taken from the nest, were inclosed in a cage ; the door was left open to admit the mother, and was then shut upon her. After many attempts, finding it impossible to get free, she first put her young to death, and then dashed out her own brains on the side of the cage."—*Lord Kaimes*.

attitudes. With the physiognomy of goodness, she possessed a gentleness truly interesting; however you might treat her, never did her claws advance from her sheaths. Sensible to kindness, she licked the hand that caressed her, and even that which tormented her. On a journey, she reposed tranquilly on your knees; there was no occasion to confine her; no noise whatever disturbed her, provided she was near some person she had been in the habit of seeing.

“In my solitary moments, (says Sonnini) she adhered to my side, interrupted me frequently in the midst of my labours or my meditations, by little caresses extremely affecting: she likewise followed me in my walks. During my absence, she sought, and called for me incessantly, with the utmost inquietude; and if I was long in re-appearing she quitted my apartment, and attached herself to the person of the house, for whom, next to me, she entertained the greatest affection. She recognised my voice, and seemed to find me again, each time, with increased satisfaction. Her advances were not oblique, her gait was frank, and her look as gentle as her character: she possessed, in a word, the nature of the most amiable dog, beneath the brilliant fur of a cat.”

THE WILD CAT,

IN this country, (*felis catus ferus*) is the largest and most destructive beast of prey extant, (except perhaps the fox.) It formerly abounded in our forests, and was considered a beast of chase, in a charter of Richard II. to the abbot of Peterborough, which permits him to hunt the hare, fox, and wild cat. This animal is now rare in Britain, and is chiefly found in the mountainous districts of Scotland and Ireland, and among the woods bordering the lakes in Cumberland and Westmoreland. They are taken in traps, or by shooting.

Their colour is commonly a pale yellowish-grey, with dusky stripes and variegations; it measures four feet from the muzzle to the end of the tail; is more robust, and possesses greater strength and spirit than the domestic animal; having the head larger, the face flatter, and the teeth and claws more formidable. It multiplies equally with the common cat: and the females of the latter will quit their domestic mates and unite with the

former. This "British tiger" prefers woods in mountainous situations, and preys on birds, and the smaller quadrupeds, rats, mice, bats, and squirrels; it also pursues rabbits and hares, makes great havoc among poultry, and will even kill young lambs, kids, and fawns. In chasing wild-cats, it is dangerous to wound them slightly; for they defend themselves with great spirit, attack the dogs with fury, and even fasten on the sportsman.

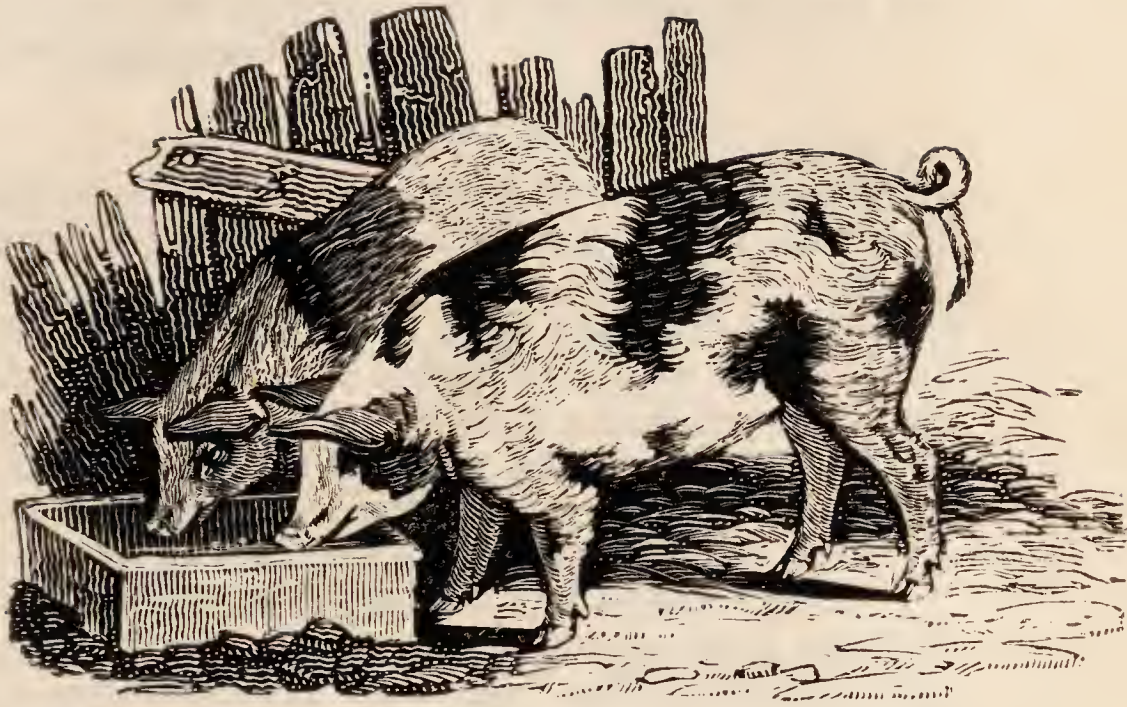
SWINE.

THE original of the domestic hog, the wild-boar, was once common in our forests, and is said, with its mate, to have been procured from Germany, at the expense of Charles I. who stocked New Forest with these animals, destroyed in the civil wars. The wild-boar was also, some years back, introduced into other forests in Hampshire, but this animal and its descendants were soon killed by the surrounding inhabitants, who lived in continual terror of their ferocious neighbours.

In New Forest, however, a breed of hogs is still found, called forest pigs, which have several characteristics of the wild-boar: broad shoulders, a high crest, and thick, bristly mane, erected on any alarm; hind parts light and thin; ears short and erect; and colour either black or darkly brindled, much fiercer than the common breed; and will turn against an ordinary dog.

The wild-boar (*sus aper*) inhabits woods, living on roots, masts, acorns, &c.; and sometimes has been observed to devour horseflesh left in the woods, and the skin of the roebuck: the claws of birds also have been found in its stomach. It is, in general, smaller than the domestic hog; but its tusks exceed in length and size, being often several inches long, and capable of inflicting most severe wounds. The females of this tribe generally bring from four to twelve young ones at a litter.

Swine unite those distinctions which separate other quadrupeds, and seem the link connecting the whole-footed and the cloven-footed animals; and also the cloven-footed and the digitated. They resemble,—the horse, in the length of their heads, the number of their teeth, and in having only a single stomach; the cow, in



Hogs.



The Pole Cat.

their cloven feet, and position of the intestines; and the digitated or claw-footed, in their numerous progeny and occasional appetite for food.

THE COMMON HOG.

A RUDE and brutal character proverbially attaches to the swinish tribe: their habits are gross; and their gluttony such, that they devour every thing indiscriminately. But though the most impure and filthy of animals, its sordidness is useful, as it with avidity swallows refuse and offal of every kind, which else would become a nuisance, and produce the worst effects. Notwithstanding this general character for gluttony, the hog is not indiscriminate in the choice of his food, for he eats 72 species of vegetables, and rejects 171.

The common hog (*sus scrofa domesticus*) will live twenty, and even thirty years; and, old writers aver, that the boar continues to grow during life. But few opportunities of ascertaining their longevity occur, as it is neither profitable nor convenient to keep this turbulent animal the full extent of its time. A neighbour of Mr. White's, in Hampshire, kept a half-bred Bantam sow, as thick as she was long, and whose belly swept the ground, till she was advanced to her seventeenth year; when she showed some tokens of age by the decay of her teeth, and the decline of her fertility. For about ten years this prolific mother produced two litters in the year, of about ten at a time, and once above twenty at a litter; but, there being nearly double the number of pigs to that of teats, many died. At about fifteen, her litters were reduced to four or five; and such a litter she exhibited when in her fatting pen. At a moderate computation she was allowed to have been the fruitful mother of three hundred pigs: a prodigious instance of fecundity in so large a quadruped.

The sow brings forth after a gestation of four months; and the middle of January, and the middle of July, are the most advantageous pigging seasons; young weaned pigs being more sensible of cold than those which suck; and there is little to dread in the middle of March, when the January pigs are weaned. At the time of parturition, no other swine should be near the sows, else the pigs would probably be destroyed as they fall.

When the sow shows the unnatural desire of devouring her own progeny, she is either muzzled, or her snout is fast strapped for several days, care being taken to attend her meals.

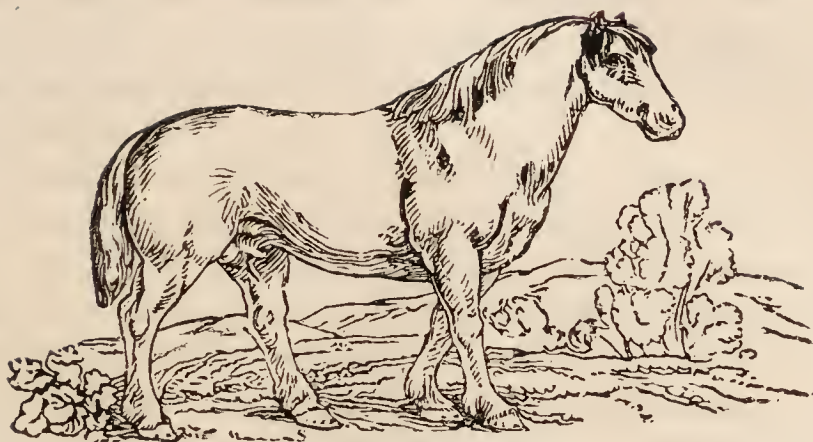
Among the various articles of live stock, few are more profitable than swine, while the number kept on a farm is proportioned to the quantity of offal, especially as the attendance they require is trifling, compared with that of others, and the benefit from their dung more than counterbalances the expense of such attendance. One hundred pounds laid out in swine, will return a greater profit than the same sum invested in other live stock.

THE ASS.

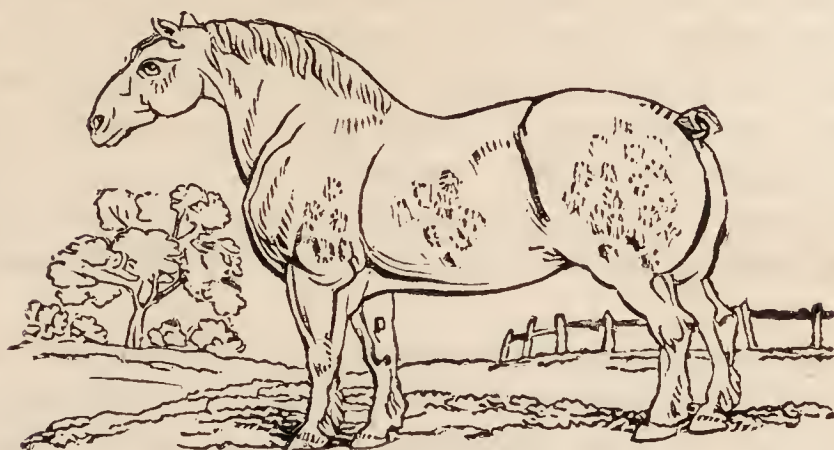
IN size, strength, and beauty, the varieties of this species, like other domestic animals, undergo many changes, and differ considerably. Those of the eastern climes, who enjoy the advantages congenial with their nature, still possess nearly all that activity, energetic spirit, and beauty, which characterise this animal in a state of independent wildness; a race, in almost every respect, the reverse of those abject creatures, their degenerate offspring, we are daily accustomed to see employed in the meanest acts of servitude.

To the misfortune of this quadruped, its value is overlooked in the superior qualities of the horse; and in this country especially, he falls to the lot of the lowest rustics and the most barbarous jobbers. When he meets with a humane master, he well repays his tenderness.

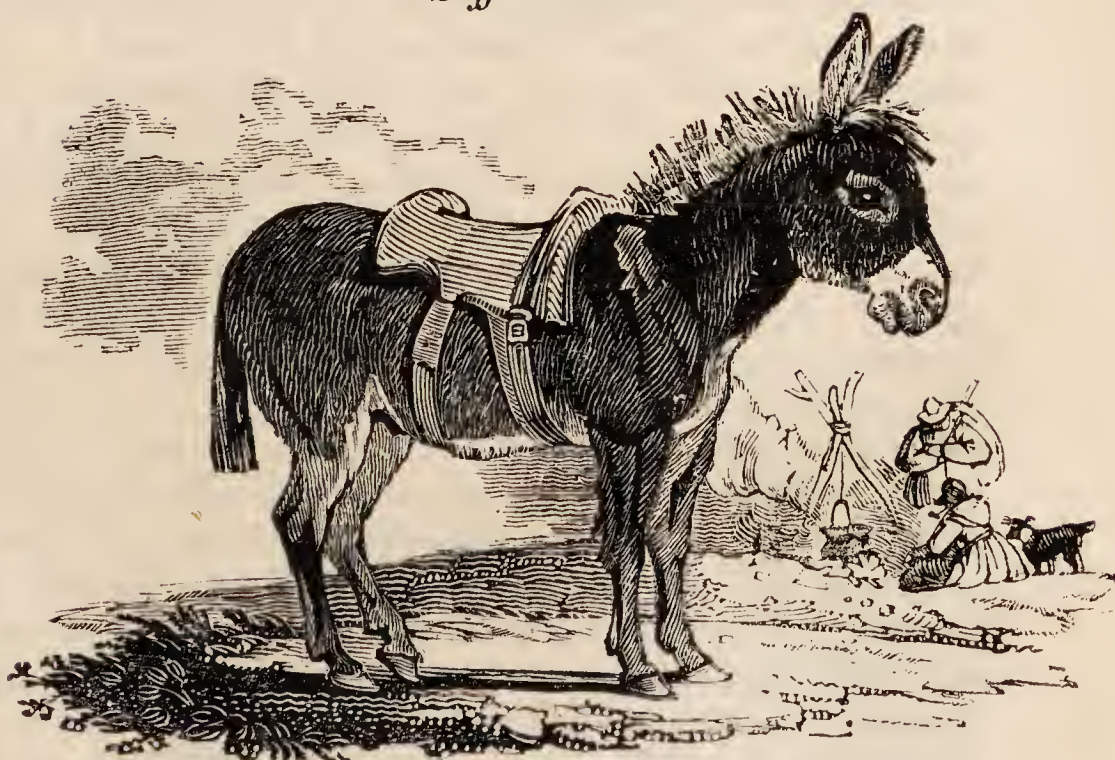
The ass, in its wild state, is naturally swift, fierce, and formidable; and will not suffer a horse to appear within its native pastures: when tamed, however, it presents a different picture. The moment its liberty is lost, it seems to relinquish every claim to independence, and assumes a meekness and submission, even humbler than its servile situation. It is the most patient of domestic quadrupeds, and suffers with constancy, if not with courage, all the ill-treatment by cruelty and caprice undeservedly inflicted. “ ’Tis an animal, (says Sterne) I cannot bear to strike—there is a patient endurance of sufferings, wrote so unaffectedly in his looks and carriage, which pleads so mightily for him, that it always disarms me; and to that degree, that I do not like to speak un-



Clydesdale Horse.



Suffolk Punch.



The Ass.

kindly to him ; on the contrary, meet him where I will, whether in town or country, in cart or under panniers—whether in liberty or bondage—I have ever something civil to say to him ; and surely never is my imagination so busy as in framing his responses from the etchings of his countenance.”

The common ass (*equus asinus domesticus*) is, like the horse, three or four years in growing, and lives also, like him, twenty-five or thirty years ; the females live longer than the male, perhaps because being often pregnant, some care is taken of them ; whereas, the males are constantly worn out with fatigue and blows. The she-ass brings forth in the twelfth month ; and displays the most determined resolution in defence of her young. Asses sleep less than horses, and lie down to sleep only when exceedingly tired. The health of this animal is mostly better than that of the horse ; he is delicate, and not nearly so subject to maladies. Of all animals covered with hair, the ass is least subject to vermin ; though infested with a peculiar species termed *pediculus asini*.

Extreme temperance in quantity and quality of provisions, is a striking feature in the character of the ass. He is satisfied with the most neglected weeds, making his humble repast on what the horse, cow, and sheep refuse. A handful of hay, a piece of bread, or some stale greens, are eagerly devoured ; he will also eat thistles and briers, and is very fond of the plaintain ; but, though indifferent about food, he is peculiarly delicate in drink. He fears to wet his feet, and even, when loaded, will turn aside to avoid the dirty parts of the road ; he never rolls in the mud, and is naturally of cleanly habits.

When young, the ass possesses much sprightliness and beauty ; but it soon loses those agreeable qualities, and becomes slow, stupid, and frequently obstinate. Its only ardour, which is extreme, is for its mate : in other respects, it is rather the passive instrument of our will, than the architect of its own destiny. Yet it seems partial to its owner, by whom it is too often abused : it scents him at a considerable distance, distinguishes him from others in a crowd, knows the road he has passed, and the place where he sojourns. When overloaded, it shews its sense of injury, by hanging down its head and

flapping its ears ; and, when too hard pressed, it opens its mouth, and draws back its lips with a ghastly grin. If blinded, it will remain motionless, however easy it might be to remove the impediments to its sight. It walks, trots, and gallops, like a horse ; but though it sets out very freely, it is soon tired, and requires to be managed with some address to make it proceed. Ill usage only confirms its obstinacy ; neither whip nor cudgel can make it move, when it has once become sullen : but this does not arise from any defect in its constitution and temper, for it is capable of being trained with the same facility as some other quadrupeds : and several animals of this kind have been rendered sufficiently sagacious and active to be exhibited as public spectacles.

It appears, from actual experiment, these useful animals can be employed to advantage in drawing waggons and other carriages. The Earl of Egremont, in 1800, formed a team of six male asses, and, during nine months, he found them of great service. They brought one chaldron and a quarter of coals twice a day, in a waggon, from the canal to his lordship's house at Petworth, showing a great degree of strength not to be expected from them. They were gentle and docile : during winter they had no oats, nor any other hay than the bands of the trusses consumed by horses, but lived on furze and holly. A Mr. Worthington worked a team of four asses at plough, yoked two abreast, driven in hand, with reins by the ploughman, and found them masters of the labour required from two common farmer's horses of a slight kind. Mr. W. esteemed an acre a good day's work ; but in cross ploughing they would do more ; for such work two asses were sometimes adequate, and two were also sufficient in turning the furrow at potatoe planting. The soil was a loamy stone brash, of middling but varying depth, and tenacious rather than light.

THE SQUIRREL.

is remarkable for lively disposition, celerity of motion, and general beauty and neatness. This elegant animal inhabits woods, and lives entirely on vegetables. It is cleanly, active, and industrious ; its eyes sparkle, and its whole physiognomy is expressive. It seldom descends



The Squirrel.



Squirrel Cage.

from the trees to the ground, except during a storm ; but continues leaping, from one branch to another, “shelling his nuts at liberty.” His activity and feats of dexterity are amusing. On extraordinary occasions, when agitated by love or anger, his muscles acquire tenfold elasticity. He descends a tree in a rapid spiral, as quick as thought—darts up another in an opposite direction—flings himself from tree to tree, with amazing exactness, and pursues his mate, or his rival, among the mazy branches of an oak, with a velocity that eludes the sight.

The common squirrel (*sciurus vulgaris*) is of a bright reddish-brown colour, except the breast and belly, which are nearly white : these colours are brightest in summer, and, on the approach of winter, change to a greyer, or browner tinge ; a variety is sometimes seen with a milk-white tail. Their young are three or four, produced about the middle of summer. The squirrel expresses its pleasurable sensations by a sound like the purring of a cat ; when in pain it utters a sharp piercing cry ; and when much irritated, makes a growling noise. His long and bushy tail protects him from the rays of the sun ; and, when extended, assists him in prodigious leaps from tree to tree, which afford so much amusement.

The squirrel’s nest is placed among the branches of a tree, where they begin to fork off. After selecting the particular spot, the animal levels the foundation, and then collecting moss, twigs, and dry leaves, forms them into a mass sufficient to resist the most violent storm. The entrance, an aperture at the top, just admits the animal, and is contrived to exclude the rain by a canopy.

The squirrel in summer feeds on buds and shoots, of the fir and pine especially ; yet it never leaves its food to chance ; but, in summer and autumn, secures, in the hollow of some tree, its magazine of nuts ; providently regarding the dreary season which strips the forests of both fruits and foliage. These winter stores are only touched when the animal is unable to go abroad in search of new supplies. Thus a single tree serves for both retreat and store-house ; and, without quitting it during the winter, the squirrel possesses all the comforts its nature is capable of receiving. Besides depositing a

large quantity of acorns in hollow trees, the squirrel also buries them in the ground; and thus plants most of those oaks called *spontaneous*; and, as his memory is perhaps not sufficiently retentive to remember the spots where he deposits every acorn, the industrious little fellow loses a few every year, which spring up and are destined to supply the place of the parent tree. Thus is Britain, in some measure, indebted to the industry and bad memory of a squirrel, for her pride, her glory, and her existence!

The squirrel's principal excursions are by night, and he shows most activity in the spring: lying quiet in the heat of the day, as if the powerful rays of the sun were disagreeable. Like every other creature, it has enemies; it is hunted by boys, who go into the woods, and make a shouting noise to stupify it; and the martin not only plunders it of its young, but sometimes takes possession of its nest. Its vigilance is extreme; if the tree wherein it lodges, be only touched at the bottom, it immediately takes the alarm and flies off to another, proceeding from tree to tree, even at the distance of forty feet. If obliged to descend, it runs with surprising agility up the side of another tree, and will take the rounds of a forest by means impracticable to any other quadruped.

Though naturally wild and timid, the squirrel is soon reconciled to confinement, and becomes docile and frolicsome. The beauty of its form, the vivacity of its motions, and the various amusing tricks it acquires, render it a favourite with young persons. It is fond of warmth, and will creep into the pocket, or bosom, of the person to whom it is attached; yet, notwithstanding this familiarity, it will, when provoked, bite keenly the hand that feeds it.

THE HEDGEHOG.

No animal is more formidable in its appearance than the hedgehog: enveloped in its spinous armour, it defies all the attacks of its enemies; the cat, weasel, ferret, and martin, soon decline the combat; and even the dog is often foiled: in attempting to bite, he more frequently receives than gives a wound; indeed, few dogs, except those trained to the sport, will contend with it, but they becoming enraged by the wounds

received from its prickles, at last compelling it to unfold, and it then soon falls a victim to their fury. Though armed at a thousand points, it is perfectly harmless, unless provoked;—it never invades, but merely repels the intruder.

It is common in the cultivated districts of Great Britain and Ireland, in small thickets, hedges, or ditches covered with bushes. It makes a hole six or eight inches deep, which it lines with moss, grass, or leaves; it feeds chiefly on the roots of vegetables, but it also eats worms, beetles, and other insects. It wanders about by night, and during the day conceals itself in its hole. When disturbed it rolls itself up into a globular form, and thus presents to its adversary an invulnerable ball of prickles; from which state scarcely any thing but cold water will disengage it; thrown into the water, it swims with ease.

The common hedgehog (*Erinaceus Europæus*) is about eleven inches from the nose to the tip of the tail, which is about an inch long. Its colour is a greyish brown; the head, back, and sides are covered with sharp-pointed prickles, about an inch long; the under part is covered with hair. The hedgehog, even when standing on his legs, has a very ugly aspect. His body is an oblong mass, convex above, terminated on the fore-part by a very sharp muzzle, and mounted on four short legs, of which nothing appears but the feet, and the tail is not discernible. His ears are broad, round, and short; and his eyes are small and protuberant. At a birth it produces four or five young, soon covered with prickles like the parent-animal, though shorter and weaker. The young, like puppies, are born blind; nor are they able, as when full grown, to contract themselves into a ball for self-defence; the curious muscle which enables the creature to roll itself up not being arrived at its full tone and stability.

The young ones are of a whitish colour, and only the points of the bristles appear above the skin. It is impossible to tame them; the mother and her young have frequently been confined together, and furnished with plenty of provisions; but, instead of nourishing them, she uniformly devoured them one after another. Males

and females have likewise been kept in one apartment, where they lived, but never copulated.

During the winter, the hedgehog continues torpid. It forms a deep warm retreat with leaves and moss, secure from the rigours of the most piercing frost ; and, at the return of spring, recommences its wanderings. Sometimes it is so completely encircled with herbage as to resemble a ball of dried leaves ; but, when taken out and placed before the fire, it soon recovers its torpid state.

The opinion that this animal sucks cows, and wounds their udders, is denied, and asserted by different naturalists. The hedgehog is also accused of robbing gardens and orchards, by first shaking down the apples, &c. then sticking them on its spines, and thus conveying away the pillage. Aldrovandus tells us, that it thus transports grapes during the vintage. This last complaint, however, is without much foundation. When kept in a garden, they never attempt to climb trees, nor to stick fallen fruit on their spines, but only take their food with their mouth.* Mr. White noticed how they ate the roots of the plantain. With their upper-jaw, (much larger than the lower,) they bore under the plant, and gnaw the root off upwards, leaving the tuft of leaves untouched ; thus are they serviceable in destroying a troublesome weed ; and though often ill-treated by wanton folly, their several habits are so perfectly innoxious, that they rather deserve protection than annoyance.

The hedgehog is frequently introduced into houses to expel those troublesome insects, the blattæ, or cockroaches, of which it is very fond and pursues with avidity. Among the Calmuc Tartars, it is kept, and, in some respects, answers the purpose of a cat. Tame hedgehogs have been taught various amusing feats ; and at

* In my garden, of near an acre, with forty large espaliered apple-trees, and numerous other fruit-trees, I kept two hedgehogs more than two years ; yet never saw any instance of mischief ; they feasted on small fruit, such as fell prematurely ; which they took in the mouth ;—of grubs they devoured large quantities, and not a plantain-root was to be seen in the second season.

Paris, a showman was accustomed to carry several about in a box. At the Angel Inn, in Felton, Northumberland, a few years since, a hedgehog was kept, which answered to the name of 'Tom, and performed all the duties of a turnspit. It ran about the house familiarly, and exhibited the most astonishing docility. At Ludlow, two of these animals, like dogs, followed their master along the street.

The hedgehog is an article of food in some places, and is best in August; they are usually roasted: the ancients used the skin for a clothes-brush; and, on the continent, calves are muzzled with it, when they are weaned.

THE DOG.

OF all animals, a dog is the only one, which, leaving his fellows, attempts to cultivate the friendship of man. To man he looks, in all his necessities, with a speaking eye for aid; for him exerts all his little services, with cheerfulness and pleasure, and bears famine and fatigue with patience and resignation; injuries cannot abate his fidelity; nor distress induce him to forsake his benefactor. Studious to please, and fearing to offend, he is a humble, stedfast, dependant; and, in him alone fawning is not flattery.

He actually forgets the bad treatment he receives, and long retains a remembrance of favours. Even with a hard and cruel master, who, instead of feeding, strikes and torments him, far from taking the smallest vengeance on him, he does not even think of leaving him; and, after seeking, with risk, some miserable food, he turns to follow him; when he has committed a fault, he crouches at his master's feet, and implores his clemency; but, when not fortunate enough to obtain it, he submits, without murmuring, to chastisement; and the next instant humbly licks the hand that punished him, recovers his gaiety, ceases his complaint, shows himself more obedient than formerly, runs at the voice, waits the orders of his master with an ear attentive and pricked up, flies on the first signal, guesses, on the slightest motion of the eye, his inclinations, and executes them punctually. Does he lose his master? he groans, he howls most dolefully, nor takes repose till he finds him; he discovers his track, often pursues his steps,

even many miles, and finds him amidst the greatest crowd. And, in journeys, what services do dogs render us? a single one is of more consequence to our safety, than ten domestics; he prevents any person coming near the baggage, or the apartments, and still less the person of his master; and watches carefully over every thing belonging to him, or near him.

In the savage state, the dog's irritable and ferocious disposition renders him a dangerous enemy to other animals; but when domesticated, his only object seems to be to please his employers, and convert to their service all his striking and valuable instincts, his courage, and swiftness. His vigilance over every thing committed to his charge, is connected with a courage in its defence, arising even to rage. His suspicions are perpetual; his inferences, on the just grounds of apprehension, astonishingly judicious and correct; and, he not only alarms the whole family which employs him as sentinel, but he darts on a supposed culprit, with a vigour and intrepidity which generally overwhelm the power of resistance.

Aided by the dog, man has reduced the other animals to slavery. Dangerous and ferocious beasts are hunted down by its means. By conciliating among the various animals by which he was surrounded, those which, at the same time that they abound in energies, are also capable of affection and obedience, man has been enabled to oppose and destroy others with which he would have been able to establish no compromise; whose ferocity is untameable, and whose power is connected only with ravage and desolation.

British dogs have long been justly prized, as excelling those of any other country; as for swiftness, the greyhound; for speed and perseverance, the fox-hound; for steadiness, other hounds and beagles; for boldness, the terrier; for sagacity, the setter; for activity, the spaniel; and for an invincible ardour, the bull-dog, whose spirit can be quelled only by death. The different and inherent qualities of our dogs are not matched in other nations. Europeans do justice to their superiority, adopt our terms and names, and thankfully receive them as a choice present; but, it is a remarkable fact, that almost every kind of British dogs degenerates in foreign climates.

The care of the dog in directing the steps of the blind

deserves particular notice ; a blind beggar was led through the streets of Rome, by a middle-sized dog, which, besides conducting his master in safety, distinguished the streets, and the houses where he was accustomed to receive alms ; he regularly stopped at every door where he had formerly been successful, and lay down to rest, when the beggar began his petition. As soon, however, as the blind man was either denied relief or served, the dog rose of his own accord, and, without order or sign, proceeded to the next house where charity had usually been bestowed. ‘I have observed,’ (says Ray,) ‘with both pleasure and surprise, that when a piece of money was thrown from a window, the dog would search for it, take it up in his mouth, and place it in his master’s hat. Even when victuals were thrown down, the animal would not taste, unless he received it from the hand of his owner.’

Of docility, the dog exhibits daily instances ; it will be sufficient to mention a few. A grocer’s dog at Edinburgh was one day treated with a pie, by a man whose business it was to sell penny pies in the street with a bell. Next time he heard the pieman’s bell, he ran up to him, and, seizing him by the coat, would not suffer him to pass. The pieman, aware what the dog wanted, showed him a penny, and pointed to the dog’s master, who stood at the door, observing this curious transaction. The dog immediately quitted his hold, and began to supplicate his master, who, putting a penny in his mouth, the creature instantly delivered it to the pieman, and received his pie ; and this traffic was daily carried on for several months.

Instances have occurred of a dog being taught to go to market with money, and carry home provisions in safety. Some years ago, the keeper of a turnpike-gate had trained his dog to go to a neighbouring town for small articles he wanted. A note mentioning the things was tied round the dog’s neck ; and, in like manner, the purchases were returned, and brought to the master with the utmost punctuality.

At Hanley, Staffs, a plumber has trained his dog to mount a ladder, and carry up or down any implement or utensil, and the diligence and care constantly evinced,

amply compensate any trouble connected with the tuition.

At a French convent, before the revolution, at a certain hour, on ringing a bell, twenty paupers were daily relieved by a machine, which turned round in the wall, and prevented either the giver or receiver being seen. A dog, belonging to the convent, had often attended the paupers, and sometimes obtained a few scraps. One day, however, having obtained very little, after all the pensioners were gone, he took the pull in his mouth, and rang the bell, when a portion of victuals was immediately produced to him. This stratagem he repeated several times; but the cook, finding twenty-one claimants instead of twenty, determined to discover the imposition. He lay concealed, saw the paupers regularly served, and the cunning dog then ringing for his dinner. The joke pleased; and, as a reward for his ingenuity, the dog was permitted to ring the bell every day, and obtained a mess of broken victuals for his pains.

A Florentine nobleman possessed a dog which would attend his table, change his plates, carry wine to him in a glass placed on a salver without spilling a drop; and also hold the stirrup in his teeth, while his master was mounting his horse.

Leibnitz says, that a Saxon peasant had a dog of the middling size, about three years of age. The peasant's son perceiving accidentally, as he imagined, some resemblance in its sounds to those of the human voice, attempted to teach it to speak. By the lad's perseverance, the dog acquired the power of pronouncing about thirty words. It, however, only exercised this extraordinary faculty with reluctance; the words being first spoken, always by the preceptor, and then echoed by the pupil. This circumstance is attested by Leibnitz, who himself heard it speak.

A servant of a gentleman at Manchester had taken out two coach-horses to water at a large stone trough, accompanied by a dog, who had long exhibited a marked attachment to one of the horses. The dog was attacked by a large mastiff, and in danger of being worried, when the horse (his friend), which the servant led by a halter, suddenly broke loose from him, went to the place

where the dogs were fighting, and with a kick of one of his heels struck the mastiff from the other dog, into a cooper's cellar opposite; and having thus rescued his companion, returned quietly with him to drink at the conduit.

A most singular act of kindness occurred in a greyhound bitch, towards a cat and her kittens. TWINK had long shown a partiality for this cat, and would suffer the cat to lie upon her, when basking before the fire, and when the bitch was tied up at her kennel, she was often attended by puss. However, puss having kitten-ed in a barn about thirty yards from the house, brought out her young family, to convey them across the yard; but, her progress being arrested by a hollow drain for water, about four feet wide, she exhibited strong symptoms of distress; these were observed by Twink; having attentively considered the situation of poor puss, she walked through the water, and carefully taking the kittens, one by one up in her mouth, she laid them without injury in a dry place, on the side next the house. The cat now followed, and expressed her gratitude in the most extravagant manner, standing on her hind-legs, purring, and licking the face of the greyhound. Twink was not less pleased, and showed her satisfaction much in the same way.

Dogs are commonly brought forth blind; the two eyelids are not simply glued together, but shut up with a membrane, which is torn off as soon as the muscles of the upper eyelids acquire strength sufficient to overcome this obstacle to vision, which generally happens the tenth or twelfth day. In two months they learn to use all their senses; their growth is rapid, and they soon gain strength. The female goes with young about nine weeks, or sixty-three days, (never less than sixty); she produces six, seven, and sometimes twelve puppies, and generally has fewer at the first than at subsequent litters.

The dog lives from ten to fourteen years; and his age may be discovered by his teeth; when young they are white, sharp, and pointed; as he increases in years, they become black, blunt, and unequal; and his age may likewise be known by the hair, which turns grey on the muzzle, front, and round the eyes. The dog will breed with the wolf and the fox; and the issue of this union

will breed, not only with other wolves and foxes, but also among themselves.*

THE SHEPHERD'S DOG.

THE wild dogs which exist in America, and in other parts of the world, most probably descend from the wolf. To this primitive race, the animal which approaches nearest is the shepherd's dog; the breed being preserved purest in the north of Scotland. Notwithstanding his ugliness, and wild melancholy aspect, the shepherd's dog (*canis domesticus*) is superior to every other in the exercise of his instinctive powers. He is born fully trained; guided solely by natural powers to keep flocks, he applies himself spontaneously with the greatest care and success. In large tracts of land, appropriated to feed sheep and other cattle, immense flocks range over extensive wilds, without control; but their watchful guardian, the dog, under the direction of the shepherd, prevents their straggling, and leads them to each part of their pasture, suffering no stranger to intrude. In the shepherd's absence, the dog keeps the flock together, and at the well-known signal, though the distance may be great, safely conducts them to his master.

A remarkable conformation of the feet is observed in the shepherd's dog; all of them have one, sometimes two superfluous toes, apparently without muscles, and dangling at the hind part of the leg, more like an unnatural excrescence, than a necessary part of the animal.

* Dogs are liable to many diseases; the most dreadful of which, not only as it effects the animal himself, but as it endangers the safety of man and other animals, is that which we usually call canine madness, though the disease is liable to be produced in some other quadrupeds as well as the dog. The symptoms of approaching madness are many, and easily discerned. When a dog secludes himself contrary to his former use, becomes melancholy or droops his head, forbears eating, and as he runs snatches at every thing; if he often looks upwards, and his stern at his setting on be a little erect, and the rest hanging down; if his eyes be red, his breath strong, his voice hoarse, and he drivels and foams at the mouth; we may be assured he has this distemper. The bite of the animal in this state is certainly fatal, unless the piece bitten be fairly and entirely cut out. Experience has repeatedly shewn, that no medicine, wash, or other remedy, though many have been (wickedly, we think) recommended as infallible, ought to be trusted to in any instance.

The shepherd's dog has been known to remain several days watching and protecting the flock, during the accidental absence of his master; and, such is his fidelity that he would sooner die than quit his charge. He possesses also the amiable qualities of other dogs.

Somewhat allied to this species, is the CUR DOG, a trusty and useful servant to the farmer and grazier. These dogs are larger, stronger, and fiercer than the shepherd's dog, and their hair is smoother and shorter. They are chiefly employed in driving cattle, and in the north of England are called *colly dogs*. This race is now generally used, and much attention is paid to the breed.

THE BULL-DOG.

THIS variety (*canis familiaris molossus*) is, like the mastiff, almost peculiar to England, and since bull-baiting (that opprobrium to a civilized nation,) has been on the decline, the breed is becoming more scarce. The bull-dog has altogether a fierce and unpleasing appearance, a large thick head, short nose, and the under-jaw shorter than the upper. His courage in attacking the bull is well-known; his fury in seizing, and invincible obstinacy in maintaining his hold, are equally wonderful. It is very dangerous to approach the bull-dog without precaution, as he frequently bites without previously barking.

THE MASTIFF.

THE mastiff (*canis familiaris Anglicus*) is larger and stronger than the bull-dog; his aspect is sullen, and his bark terrific. Yet he commands respect, rather than excites terror, unless when his duty comes in competition with his good-nature. The mastiff, pure and unmixed, is now seldom met with; the generality of dogs so denominated being compounded of the bull-dog, the Dutch mastiff, and the ban-dog, which latter variety is smaller, more active and vigilant, but less powerful than the mastiff.

The mastiff is employed to guard our yards, and will often suffer a stranger to come within his province, and will peaceably accompany him, as long as he forbears touching any thing; but the moment he attempts to lay hold of any article on the premises, or to leave the place,

the animal begins to growl, and convinces him that he must neither steal nor depart. He seldom, however, uses violence unless resisted; and even then he will vanquish, but not injure the intruder, holding him down, without biting, for hours, unless he is earlier relieved.* Notwithstanding the mastiff's ferocious disposition, a bitch has been known to suckle two lambs, the ewe being lost, and the bitch having been deprived of her puppies.

The mastiff is perfectly conscious of his superior strength, and will sometimes, with great dignity, chastise the impertinence of an inferior. A large mastiff dog, belonging to a gentleman who resided at Heaton, near Newcastle, being teased by the barking of a mongrel, took it up in his mouth, by the back, and, with great composure, dropped it over the quay into the river, without taking any other revenge on an adversary so contemptible.

THE HOUND.

My hounds and beagles are of Spartan breed,
So flued, so sanded, and their heads are hung
With ears that sweep away the morning dew;
Slow in pursuit, but match'd in mouths like bells,
Each under each, that made the welkin ring,
And fetch'd shrill echo from the hollow earth.

SHAKESPEARE.

WITH this animal (*canis familiaris sagax*) may be ranked the harrier, and the fox-hound: the former, employed in hunting the hare; and the latter, stronger and fleetier, for chasing the fox.

We have several kinds of harriers, each of which has its excellence; according, perhaps, to the country where it is employed; or, in some instances, according merely to the whim or fancy of the owner. The Southern hound is very slow, but will hold out in a chase many hours. Its cry is deep, and fine; and the whole pack generally keep well together, from the nearly equal speed

* In a bleaching ground near the race-course, Manchester, two mastiffs went their rounds through the night. Some depredators entering, one was attacked and brought to the ground, and the dogs, in turn, stood to guard him, or went round the crofts, until the workmen arrived in the morning.

of the dogs. In open countries, where there is good riding, a species of this dog is preferred that is fleet of foot, having sharp noses, narrow ears, deep chests, with thin shoulders. These show a quarter cross of the fox-hound.

Beagles are nimble and vigorous, pursue the hare with impetuosity, do not give her time to double; and, if the scent lies high, will easily run down two brace before dinner. They are not, however, always to be depended on; and require the constant discipline of the whip, and to be perpetually hunted, to make a good pack.

A perfect harrier should be of the middle size, with a broad, rather than a round back. His nose should be large, nostrils wide, chest deep and capacious, fillets great and high, haunches large, and hams straight. The feet should be round, the soles hard and dry, and the claws large. The ears should be wide, thin, and more than sharp: the eyes full, forehead prominent, and the upper lip thick, and deeper than the lower jaw.

THE FOX-HOUND.

The pack is fir'd; they yell, they snuff, they vent,
And feed their stretching nostrils with the scent;
The wily fox hears th' unexpected sound,
The fox-hounds' noise his wakeful ears do wound.

VIRGIL.

IN England, the utmost attention is paid to the breeding, education, and maintenance of this animal; and its value has, consequently, greatly increased; a pack of favourite hounds having fetched the enormous sum of one thousand guineas.

Hounds, to look well, should be nearly of a size; their colour is not an object, except as it regards beauty. Height and shape are more important. The legs of a hound should be straight, feet round and not too large, shoulders lying back, breast rather wide than narrow, chest deep, back broad, neck thin, head small, tail thick and bushy, and which, if he carries well, will add to his comeliness. Though a small head is one requisite of a fox-hound, this regards beauty only; for large-headed hounds are not inferior in goodness.

Of the long-continued speed and astonishing exertions of fox-hounds we have many instances. On the 8th of June, 1808, near Dunkeld, in Perthshire, a fox and a hound were seen on the high-road, proceeding at a slow

trotting pace. The dog was about fifty yards behind the fox: and each was so fatigued as not to gain upon the other. A countryman easily caught the fox by running, and both the fox and the dog were taken to a gentleman's house in the neighbourhood, where the fox died; it was afterwards ascertained, that the hound belonged to the Duke of Gordon, and that the fox was started on the morning of the king's birth-day, on the top of those hills called Mona-liadh, which separate Badenoch from Fort Augustus. From this it appeared that the chase lasted four days, and that the distance travelled from the place where the fox was unkennelled, to the spot where it was caught, without making any allowance for doubles, crosses, and tergiversations, exceeded seventy miles.

THE IRISH GREYHOUND.

So faithful when strok'd; so fierce when provok'd!

THIS animal, the largest of the dog kind, is rarely found in Ireland, a large number having been purchased and sent to Poland. They are, indeed, seldom found now in any part of the world; Buffon says, he saw only one in France.

These dogs were, probably, first imported into Ireland by the Danes, who long possessed that kingdom. They were originally used to chase the wolf, on whose extirpation they were kept only for show.

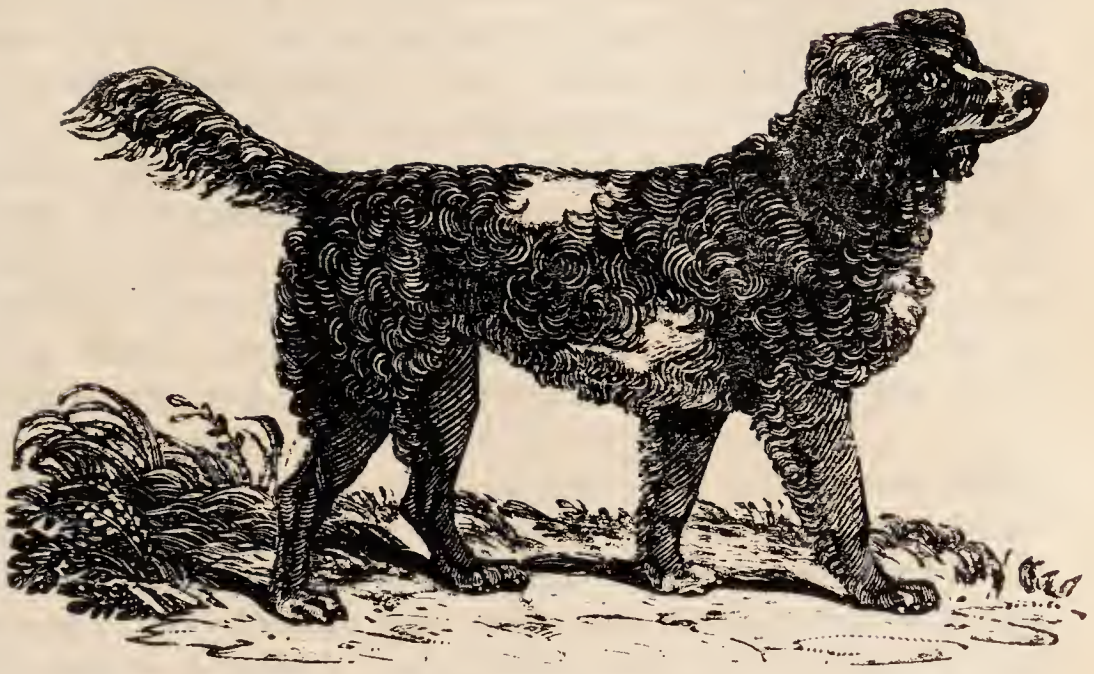
The Irish greyhound (*canis familiaris Hibernicus*) is usually about three feet high, of a white, or cinnamon hue, resembling a greyhound in shape, but more robust; it is of a gentle disposition, but by its strength, superior in combat to the mastiff or bull-dog. It is equally serviceable for hunting either the stag, the fox, or the hare. The marquis of Sligo possesses the only remaining dogs of this breed in Ireland.

THE COMMON GREYHOUND.

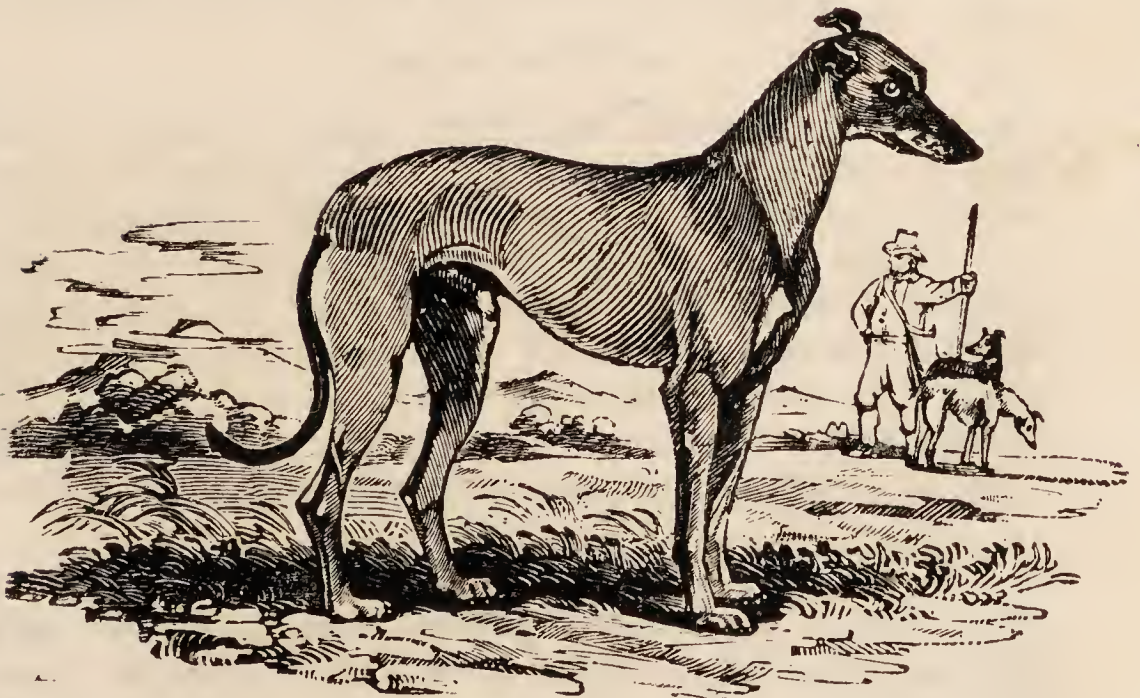
See the impatient greyhound, slipt from far,
Bounds o'er the glebe to course the fearful hare;
She, in her speed does all her safety lay,
And he with double speed pursues the prey;
O'er-runs her at the sitting turn, and licks
His chaps in vain, and blows upon the flix.

OVID.

THE greyhound (*canis familiaris grajus*) is the swiftest of the canine race; but not possessing the fa-



The Spaniel.



The Greyhound.

culty of scent, it follows only by the sight. Formerly the greyhound was considered a very valuable present, especially by the ladies, with whom it was a great favourite. Greyhounds were often received by King John instead of money, as payment, for the renewal of grants, fines, and forfeitures to the crown: this monarch being very partial to the greyhound. A fine paid A.D. 1203, mentions five hundred marks, ten horses, and ten leashes of greyhounds; another, in 1210, one swift running horse, and six greyhounds. The laws of King Canute enacted, that no person under the degree of a gentleman, should presume to keep this animal.

Greyhounds were used formerly to course the deer, the fox, and the hare. In a hilly country the greyhound would be superior to a first-rate horse in swiftness. A brace of greyhounds have been known to run four miles in twelve minutes; and, even coupled together, have chased and killed a hare. Of their ardour and velocity many uncommon instances are recorded. In 1811, as the hounds of John Bean, Esq. of Clapham, were running a hare hard in view on the Downs, near Crowlink, Sussex, the animal, to escape her pursuers, ran over the cliff, and was dashed to pieces. Five couple of the dogs unluckily followed and shared the same fate.

THE LURCHER.

THE lurcher (*canis familiaris laniarius*) does not trust to his scent, or his speed, but seizes his prey chiefly by stratagem. When he comes into a warren, he deceives the rabbit, by seeming to attend to some other object, till the animal is within reach, which he then takes with a sudden spring. The lurcher is nearly related to the terrier; it is shorter than the greyhound, but its limbs are stronger; there are two sorts, the hair of one is thick set, and of the other long and harsh.

THE TERRIER.

THE terrier (*canis familiaris terrarius*) is a small rough hound, with a most acute smell; the natural enemy of rats, mice, weasels, and other vermin. He possesses such courage as to attack even the badger; nor can the most resolute opposition daunt his ardour. He is likewise employed to drive the fox from his hole;

and is therefore a peculiar favourite with sportsmen, and highly esteemed as a domestic companion.

A variety of the terrier, marked with white, tan-colour, and black, has been lately introduced into some parts; and, being rather scarce at present, are proportionably valued. They possess many agreeable qualities, have the spirit of sporting dogs, the attachment of the most faithful of the kind, and the elegance of the lap-dog.

That terriers are susceptible of many of the passions which agitate mankind, and no small share of address, are manifest by the following anecdote: a gentleman, from Swinmerton, near Stone, Staffordshire, used to come twice a-year to town, on horseback, accompanied by his terrier; but for fear of losing it in the metropolis, he always left it in the care of his landlady, at St. Alban's. Once, however, the large house-dog of the inn, and the terrier guest, having a quarrel, the latter was so much over-matched, that it was with difficulty he could crawl; he went silently away out of the yard, and for a week no one knew what was become of him. He then returned, and brought with him a friend, a dog both larger and stronger than that by which he had been beaten, and they both fell upon the former victor, and bit him most unmercifully, leaving him half dead. The terrier and his friend again disappeared; and, as this happened while the gentleman was in London, when he called, in his way home, at St. Alban's, he had the mortification to hear the above particulars, and gave up his dog for lost. On arriving at his home, however, he found his terrier safe; and, on inquiry into circumstances, was informed, that he had returned on being first missed from St. Alban's, and had coaxed away the great house-dog, with which he proceeded to avenge the injuries he had received, and then came home in quiet with his companion.

THE BLOOD-HOUND.

THE blood-hound (*canis familiaris sanguinarius*) and, in Scotland, called the sleut-hound, is of a most beautiful form, of a reddish brown or tan colour, and taller and larger than the hound; it is also superior to every other kind in activity, speed, and sagacity.

The blood-hound never barks except during the

chase. Being remarkable for his fine scent, our ancestors highly valued, and frequently employed him to recover game, which had escaped wounded from the hunter, or had been killed or stolen out of the forest. When the thief or murderer had fled, this useful creature would trace him through the most secret recesses, however great the distance. His acuteness of smell is so extraordinary, that it has traced a man the distance of seventy miles, along a much frequented highway, and through several market-towns, to the very upper-room wherein he was taking refreshment.

A few of these dogs are still kept in the royal forests, to pursue deer that have been previously wounded by a shot to draw blood, whose scent enables them to follow with unerring steadiness; and they are sometimes used to discover deer-stealers, whom they trace by the blood of their wounded victims.

THE POINTER.

See in his mid-career the pointer, struck
Stiff by the tainted gale, with open nose,
Outstretch'd, and finely sensible, draws full,
Fearful and cautious on the latent prey.

THOMSON.

THE pointer (*canis familiaris avicularis*) of Spanish extraction, was unknown to our ancestors. The large Spanish pointer's sense of smell is very delicate; but he cannot endure so much fatigue as the English pointer.

The pointer should be of a middle size, well made, light, and strong. A small pointer, though excellent, can be of little service, in thick high stubble, among turnips, or heath; and the feet of a large heavy dog are apt to flay in hunting.

Such is the steadiness of this dog, that one belonging to Colonel Thornton actually kept his point for more than an hour, while an artist sketched him in that attitude. Deane mentions a very extraordinary instance of the pointer's sagacity. A sportsman, on returning from his day's diversion, was accustomed to discharge his piece at magpies, crows, &c. The dog always kept behind at a little distance, to avoid frightening the birds. On one occasion, however, a magpie, perched in the top of a large oak, escaped the sportsman's notice. The dog,

ever attentive to his master's pleasures, peeped into the tree, and espying the party-coloured bird, ran to his master, who was some yards from the place, took hold of the tail of his coat, and gave it a smart pull. The gentleman, in surprise, turned to see what was the matter, when the dog immediately trotted back to the tree, and showed him the bird, which was very soon dispatched.

THE SETTER.

THE uses of this valuable dog are well known. His scent is exquisite, his feet durable, and he is, generally speaking, preferable to the pointer, in countries where there is plenty of water, as he cannot endure heat or thirst so long as the pointer. Of the stoutness of the setter, (*canis familiaris index*) Mr. Elwes mentioned a decisive proof; a setter of the breed for which he was so celebrated, following him to London, hunted all the fields adjoining the road, through a distance of sixty miles.

THE NEWFOUNDLAND DOG.

THESE faithful and sagacious animals, now commonly used instead of the mastiff to guard our houses, were originally brought from Newfoundland, where the settlers employ them in bringing wood in sledges, from the interior parts of the country down to the sea-coast. Their strength is very great, and their docility remarkable. They are web-footed, and, therefore, calculated to swim with great facility, in consequence of which they have saved numbers from a watery grave. Nor is it their masters only that they will endeavour to assist; they seem naturally disposed to rescue from the water any being that is in danger of perishing.

In the summer of 1792, a gentleman at Portsmouth, bathing in one of the machines, unacquainted with the steepness of the shore, and no swimmer, was soon out of his depth. His danger was not noticed by the person whose business it was to attend him, and probably he would have perished, had not a Newfoundland dog on the shore providentially seen the accident, and, swimming to his assistance, dragged him to the beach in a state of insensibility, from which it was some time before

he recovered. The gentleman purchased his preserver at a great price, and considered him as the most valuable property he had.

During a violent storm, in 1789, a ship, belonging to Newcastle, was lost near Yarmouth, and only a Newfoundland dog escaped alive, which swam ashore with the captain's pocket-book in his mouth. He landed amidst a concourse of people, attracted together by the catastrophe, several of whom attempted but in vain to rob him of his prize. The sagacious animal, as if conscious of the importance of the charge, which perhaps was intrusted to him by his perishing master, at length selecting a person who seemed worthy of his confidence, he leaped in a fawning manner upon him, and delivered the book to him. This duty discharged, he returned to the place where he had landed, and anxiously watched and seized every article that was driven ashore from the wreck.

THE WATER-DOG.

THIS animal (*canis familiaris aquaticus*) swims with singular activity and ease, and being fond of the water, is very useful to the sportsman, in fetching any bird which has been shot, and may have fallen into it. The water-dog has a long and shaggy coat, which often grows over his eyes. The form of the large water-spaniel, or finder, is elegant: the hair is beautifully curled, and his whole aspect is mild and sagacious; it is chiefly used in discovering the haunts of wild-ducks, and other water-fowl. The small water-spaniel resembles it in form, habits, and disposition.

THE SPANIEL.

THIS dog (*canis familiaris extrarius*) though named hispaniolus, or spaniel, from the country whence we originally derived the breed, is now so completely naturalized, that it may be considered a British animal. Dogs of this kind vary in size, from the setting dogs to the springing spaniels, and some of the small lap-dogs. The Blenheim breed, a beautifully marked variety, is the most fashionable, at present, for dogs of pleasure, being frequently sold at from three to ten guineas each; but fancy gives them such a value.

Spaniels are affectionate, playful creatures, without any marked character; yet not destitute of sagacity. Some years ago, a gentleman presented to a friend going on the continent, a little favourite spaniel, which was carried to Brussels; and, after a few days, disappeared. His new master, in the first letter he wrote to England, with regret mentioned the loss of the dog to his former master, who had scarcely read it, before he heard a scratching at the street-door. On opening it, the identical little-dog was waiting to obtain admission. It had found its way from Brussels, in safety, by some conveyance never accounted for, and had travelled almost as quick as the mail.

King Charles's breed, as they are called, are distinguished by their black colour, and black palate. For this breed Charles II. was celebrated; and so partial was he to it, that he generally came to the Council Board accompanied by a favourite spaniel. His successor, James II., had a similar attachment; and Bishop Burnet reports of him, that being once in a dangerous storm at sea, and compelled to quit the ship, to save his life, he vociferated with impassioned accents, as his principal concern, "save the dogs and Colonel Churchill."

Of maternal kindness in the spaniel, we have to record a singular example, where the partition between instinct and reason seems very slight indeed. A favourite bitch had three puppies; two strong and healthy, the third very weakly; as often as the latter attempted to suck, it was driven away by the two others, and scarcely received any sustenance; at length the mother determined on the following expedient to save the life of her offspring. Whenever the sickly puppy showed any desire to suck, she immediately took it in her mouth, and ran into the family sitting-room, as if to seek the protection of the females, and there suckled her puppy in safety. This act of maternal kindness was performed a long time, and concluded in rendering the object of it strong and healthy.

THE TURNSPIT.

THE breed of the turnspit (*canis familiaris vertagus*) will probably be extinct in Britain in less than a century. It is a bold, vigilant, and spirited little dog, ge-

nerally long-bodied, with short crooked legs ; it is frequently spotted with black; and its tail is curled on its back. On the continent, this dog is still much used to run in a wheel, to turn meat that is roasting ; but a more easy and expeditious mode of cookery being resorted to in our country, his services are in little request.

THE COMMON OTTER.

THE otter, (*lutra vulgaris*) swims with great ease and readiness, both on and below the surface of the water. This animal, however, does not continue long immersed, but occasionally puts its nose above water to take in a supply of fresh air. It is not strictly amphibious, for it lives on land in burrows and dens, in the banks of lakes or rivers, where the females produce and nourish their young. The otter is a solitary animal, seldom more than a pair being seen together. It feeds chiefly on fish ; and the peculiar situation of its brilliant eyes enabling it to see every thing above it, adds to the extent of its depredations in fish-ponds and streams.

In very hard weather, when its usual food fails, the otter will kill lambs, sucking pigs, and poultry, and even infest the rabbit warren. Two gentlemen shooting at Pilton, in Devonshire, the pointer suddenly stood at some brakes, and a large otter bursting out, the dog seized it, but being severely bitten was soon compelled to quit his hold. After driving the otter about for some time, in a turnip-field, it was killed by blows upon the head. This animal was five miles from any pond or river that could supply it with fish.

The females go with young about nine weeks, and produce usually four or five, in March. When six weeks old, they are driven from the nest by their dam, and sent to procure food for themselves. Otters' cubs have been suckled and reared by bitches.

The otter constructs its own den, and always makes its entrance hole under water, working upward to the earth's surface, where it forms a minute orifice to admit air ; the more effectually concealed by this little air-hole being in the middle of some thick bush. Sometimes he adopts, as his place of residence, any hole convenient for his purpose, under the roots of trees, or in the clefts of rocks, near the water ; and the track to the

den is often trodden like a common pathway, the entrance being strewed with the fragments of putrid flesh. His retreats exhale a noxious odour from similar remains of putrid fishes; and his own body has a bad smell. The dogs chace the otter spontaneously, and easily apprehend him when at a distance from water or from his hole. But, when seized, he defends himself, bites the dogs most cruelly, and sometimes with such force as to break their leg-bones, and never quits his hold but with life.

Although the otter is cunning, and exceedingly ferocious, it may, when caught while young, be rendered as docile and domestic as a dog. It will sleep in the same room or bed with its master, and, when properly trained, is very useful in catching fish.

The young otter is, for some little while, to be fed on milk or soup, and without animal food of any kind. Bread is afterwards substituted for these; and with this the heads of fishes. As soon as it has formed an attachment to the person who feeds it, which will be in a short time, its education should commence.

The otter is only caught by an unbaited trap; for he is so delicate in his feeding as to reject every kind of bait. Once, however, an instance occurred to the contrary. A gentleman trolling for pike, an otter darted from his hole, and seized the bait, and after a long contest the animal was drawn to the shore, quite exhausted.

THE GOAT.

ON the frightful precipices of the majestic Snowdon, the wild goat may be seen, fearlessly bounding from crag to crag, leaping and dancing on spots where the pedestrian would tread with the utmost caution, and where "to look" would be "to topple down headlong" from the perilous height. Goats once abounded in North Wales, but their mischievous practice of eating the bark of trees in plantations, has caused their destruction, and they are now found chiefly in the recesses of the mountains. However, they abound in many parts of Ireland, and in the Highlands of Scotland, but those of Wales are of superior size, and a whitish colour.

Goats are distinguished from sheep, not only by their covering, which varies with climate; but also by their



The Goat.



The Goat Herd.

horns, which are hollow, annulated, and gently inclining backwards. They prefer retired mountainous situations, and smell rank, particularly the males, which are always honoured with most venerable beards.

The common domestic goat (*capra ægagrus hircus*) is found in most parts, enduring, without inconvenience, the extremes of heat and cold. But its value is overlooked, because the sheep so far exceeds it, in utility. The ass, in like manner, is of little consequence, because superseded by the horse.

However, for the independent life it enjoys, the goat seems better adapted than the sheep. It is more lively, and possesses more animal instinct; it readily attaches itself to man, and appears sensible of his caresses; it is stronger, swifter, more courageous, playful, capricious, and vagrant, than the sheep. Though not averse to society, it is with difficulty confined to a flock; it loves to stray from its companions, and to choose its own pastures. It delights in climbing the ridges of houses and precipices, and seems most happy when (to our apprehension,) on the verge of destruction. Nature, indeed, has fitted it for traversing declivities with security; its hoofs, hollow underneath, and with sharp edges, render its footing secure on the steepest ridges. Two of them yoked together, will take the most hazardous leaps with such perfect uniformity, as seldom to miscarry, or disappoint each other.

Goats being hardy, and easily sustained, generally fall to the lot of the poor, who have no pastures to support more delicate animals. They prefer the neglected wilds to cultivated fields; the heathy mountain, shrubby rock, tops of boughs, or bark of trees, furnish their favourite food. They equally disregard heat and cold, storms or calm weather; and, under every external circumstance, preserve their vivacity of disposition, and spend their time in capricious frolics. The female goat produces two or three kids at a time: she goes with young five months, and frequently breeds twice a-year.

The milk of the she-goat is sweet and restorative, and well adapted to stomachs of weak digestive powers. It will not coagulate, like that of the cow; and from the animal's peculiar food, it has a flavour grateful to most palates. It is much drunk in the Highlands of Scot-

land, by persons purposely resorting thither : and is often found more salutary than any medicine in consumptive cases.

In several parts of both Ireland and Scotland, goats constitute the principal wealth of the poor natives, whose beds are made with their skins ; their milk furnishes a simple aliment, besides what is converted into butter and cheese ; and their flesh, particularly that of the kid, when its owner can afford to eat it, is a delicacy fit for an epicure.

Though the flesh of the full-grown animal is not comparable to mutton, it is not certainly to be despised. The value of the milk has been noticed ; the suet is made into candles ; from the hair, perukes, and even cloth can be manufactured ; and the skin and horns are applicable to numerous purposes.

THE MULE.

NATURE, which preserves the form of each animal uncontaminated, has reared this hardy offspring of the horse and the ass, generally incapable of reproducing its species. In hot countries, mules have sometimes brought forth young, but such instances are very rare in Great Britain.

This useful and very healthy animal (*equus asinus mulus*) will live about thirty years. Mules are chiefly used in rocky and stony countries, as the Alps, Pyrenees, West India Islands, &c., numbers being kept in these places ; they are usually black, strong, well-limbed ; and large, and some, bred out of fine Spanish mares, are fifteen or sixteen hands high ; and the best have sometimes fetched forty pounds a-piece. No creatures are so sure-footed, or proper for large burthens. They are stronger for draught than English horses, are often as thick-set as our dray-horses ; and will travel several months, with six or eight hundred weight upon their backs.

The mules bred in cold countries are most hardy and fittest for labour ; and those which are light-made are fitter than horses for the riding walk and trot. Mules might be bred to great advantage in England, and would be found serviceable in agriculture on light soils ; and as they may be procured of any colour, how very elegant to have a carriage drawn by four white mules ? Their



The Mule.



Mule Driving in Spain.

hardiness and longevity are strong recommendations. In winter, straw is their only food ; and two working mules in Shropshire reached the age of seventy years each ; they perform a deal of work at two years of age, are fit for use at three, but do not arrive at perfection till some years afterwards.

The best mules are produced from a mare and a fine foreign he-ass, for which latter in Spain fifty or sixty pounds are commonly given. In breeding these animals, mares are employed of a very large and well-made breed, young, full of life, large barrell'd, but small limbed, a moderate sized head, and a good forehead. The foals, from the time of being dropped, are often handled to make them gentle ; it prevents hurts by skittishness and sudden frights, and they are more easily broken at the proper age, and soon become docile and harmless, without any of that viciousness so common in those animals. They may be broken at three years old, but should never do much hard work till four ; thereby being secured from injury by hard labour till they have acquired strength enough to bear it.

In travelling a mountainous country, the mule excels the horse : hence in Spain, among the Pyrenees, and on the Alps, its services are highly estimated, as it will tread with the utmost security where a horse can hardly stand. Their manner of descending the most frightful precipices is truly wonderful.—When they come to the edge of one of these deep declivities, they stop ; then place their fore feet in the posture as if stopping themselves ; they next put their hind feet together, a little forward, as if in the act of lying down. In this attitude, having surveyed the road, they slide down with the swiftness of a meteor ; but if the rider give the least check to the mule, both unavoidably perish. In this rapid descent their address is astonishing ; for, in their swiftest motion, when they seem to have lost all government of themselves, they follow exactly the different windings of the road, as if they had in their minds previously settled their route, and taken every precaution for their safety.

LECTURE LXIII.

THE HORSE.

THE horse is the most beautiful four-footed animal; excelling in symmetry of body, speed, and general utility to man. If custom had not dignified the lion as the King of Beasts, the title would be conferred on the horse. The lion, rather than the king of animals, is their tyrant; only devouring, or inspiring them with terror: whereas, the horse never injures other creatures, in either their persons or properties: he discovers nothing to expose him to the least aversion; without possessing any bad quality, he enjoys all that are amiable. Of all animals he has the finest shape, is the most noble in his inclinations, the most liberal of his services, and the most frugal in his food. Survey all the rest: is there one whose head discloses such beauty and grace—any eyes that sparkle with more fire—a more stately chest, a lovelier body, a mane floating in the wind with greater majesty, and limbs of a completer flexibility? Let him be managed by his rider, or, divest him of his bridle and suffer him to range through the fields at full liberty, all his attitudes evince a noble deportment and an air which make an impression even on those least acquainted with his virtues. He is yet more engaging in his inclinations, and can properly be said to have only one—to render service to his master.

Has he to cultivate land, or carry baggage? he is always prepared, and would sooner sink under the weight of his labour, than decline them. Is he to bear his master in person? he seems sensible of the honour, he studies how to please him, and, at the least signal, varies his pace; is always ready to slacken, redouble, or precipitate it, when acquainted with his rider's will. The length of the journey, the unevenness of the way, ditches, or rivers the most rapid, cannot discourage him; he springs through every obstacle, like a bird whose career no impediment can check.

The horse was early made subservient to the will of man, and, therefore, the employment of this animal is probably almost coeval with mankind. In two passages in the bible (Gen. i. 9. Exod. xiv. 9.) chariots

and horsemen are named together; hence there is little doubt, that the use of chariots and the art of riding were introduced about the same time; the latter being somewhat prior to the former; and probably Egypt was the country to which mankind are indebted for the equestrian art, though the precise time of its first practice cannot be so easily ascertained. Yet it is certain, that when Jacob came into Egypt, he found the inhabitants acquainted with and using the horse, for both carrying and drawing. Hence it was conveyed to the Ethiopians, Arabs, Indians, and other neighbouring nations.

The genus of the horse (*equus caballus*) varies with soil and climate; horses of warm climes, and dry soils, are of the truest proportion, the finest skin, and the most generous spirit; therefore the fleetest and fittest for the saddle. To the north, the animal is more robust, and possesses little symmetry of shape:—it is coarse-haired, hardy, and slow, fitted for draught, and the more laborious purposes of life. The species thrive, with proper care, in all habitable countries; but succeed best under the temperate zones, and upon fruitful and graminiferous soils.

The easiest method is to divide the genus of horses into two original and distinct species, the fine and speedy, and the coarse and slow; to which all varieties may be traced; and the various intermediate degrees also may be influenced by soil and climate; but it is not probable that any length of time, or change of soil, could convert the delicate, silk-haired, flat-boned courser of the southern countries, into the coarse, clumsy, round-made cart-horse of the north of Europe.

The original countries of the two opposite races, are the mountainous part of Arabia, and the lowlands of Belgium. Arabia is the oldest breeding country in the world; having, for thousands of years, been known to possess a pure and unmixed race of horses, and the experience of ancient and modern times has proved them of superior form and qualification to all other horses. In the early ages, the breed of Arabian horses was sought and dispersed over most parts of Asia and Africa, and thence to the southern parts of Europe; in more modern times, they have been introduced further

north, particularly into this country, originating that race of blood horses for which England is celebrated.

Arabia is distinguished for the excellence of its horses, and the address of its inhabitants in riding them. The horses are bred for sale; and a considerable revenue arises from those sent out of the country, the tax being about ten pounds sterling for each horse. These people are scrupulously exact in preserving the pedigree of their horses for several ages, to know their parentage, alliances, and genealogy; distinguishing each breed by different appellations, and dividing the whole into three classes.

The first class, called noble, is the most pure and ancient, without any mixture of the sires and dams. The second class is composed of horses, whose race, though ancient, has been mixed with plebeian blood, on either the male or female side; is still deemed noble but misallied. The last class comprehends common horses; which are sold at a low price; while the two former sorts are extremely dear, the lowest priced mares of the first class being worth five hundred French crowns, and some fetching four, five, or even six thousand livres. When a mare drops her foal, a certificate is drawn up and signed in the presence of a magistrate; and this voucher is given with the animal, like the deed of an estate, when it is sold.

In our own country, the breed of horses is very ancient, as Julius Cæsar mentions, that on his first invasion, the Britons had great numbers well trained to warlike exercises.

The fiery courser, when he hears from far
The sprightly trumpets, and the shouts of war,
Pricks up his ears, and trembling with delight,
Shifts pace, and paws; and hopes the promis'd fight.
On his right shoulder his thick mane reclined,
Ruffles at speed, and dances in the wind;
His horny hoofs are jetty black and round;
His chin is double; starting with a bound,
He turns the turf, and shakes the solid ground.
Fire from his eyes, clouds from his nostrils flow;
He bears his rider headlong on the foe.

The Romans, probably, contributed little to the improvement of the British breed of horses; since no

traces of amendment are to be found during so many ages.

The first period of particular attention to the amendment of our breed of horses, are the reigns of Henry VII. and VIII.: but the regulations then made, and the means employed, agreeably to the genius of those unenlightened times, consisted of arbitrary directions and impolitic restraints, not calculated to advance the intended purpose. Magistrates were empowered, at Michaelmas tide, to scour the heaths and commons, and to put to death all mares considered of insufficient size to bear good foals; and the prohibition of one of the Saxon monarchs, to export horses, was continued in particular stallions.

In the reign of Elizabeth, a gradual improvement in the breed of English horses took place, by the importation of foreign stock. Mention is made of a horse which, for a wager, travelled eighty miles within the day. The desire of improvement was so diffused, that even carters had become nice in their choice of horses. The following racers were well known to the gentlemen breeders of the country; namely, "the Turk, the Barbarian, the Sardinian, the Neapolitan, the Jennet of Spain, the Hungarian, the high Almaine, or German, the Friezeland, the Flanders, and the Irish Hobby." Still horses were so deficient in number, that on the Spanish invasion, the queen found much difficulty in mounting two or three thousand cavalry.

In the reign of James, horse-racing became fashionable throughout England; a favourite diversion of most of the princes of the royal house of Stuart, and particularly encouraged by them. Even Cromwell did not forget that necessary appendage—a stud of race-horses. Richard Place was the Lord Protector's stud groom; and the famous White Turk has immortalized himself and his keeper: the conjoined names of the man and the horse, Place's White Turk, will be delivered down to the latest posterity.

By instituting "Royal Plates," at the restoration, additional encouragement was given to horse-racing, and much emulation was promoted among breeders, with the judicious view of perfecting and extending a race of horses, fit for the road, the chase, and for war; and en-

lightened policy allowed free exportation. From this period, to the middle of the last century, the system of renovation from the different original foreign stocks, has been occasionally adopted; the consequences have been a decided superiority over the parent stock from each country; and a peculiar breed of our own, of all denominations, of superior proportion, speed, power, and utility.

This superiority having long been established, with some slight exceptions, perhaps we have little necessity for recourse to any foreign stock, with the view of improvement; that being in our power, even to the highest perfection, by judicious selections from our own native racers. Indeed, late importations of foreign horses, (almost entirely confined to Flanders and Friezeland,) have been rather to obtain serviceable draught cattle, for immediate use, at more reasonable rates than they could be bred at home, than for the purpose of breeding. No importation of saddle-horses has taken place since the last century; the Arabians, Barbs, and other foreign stallions, formerly so essential in our studs, have for some years ceased to be in request, and but few of them are now in the country. The marks of foreign origin are distinguishable in very few English horses; being lost in the characteristic form of the country, which time, climate, good provender, and care have established. Our racing stock, though it has lost in delicacy of skin and warmth of temperament, has gained in size, proportion, speed, and continuance; and our cart-horses, with a peculiar characteristic rotundity of form, have acquired more beauty, and greater activity, than the species upon the continent from which they have descended.

The saddle-horses of England are in request in foreign countries, for their superior action, strength, proportion, and beauty. No people in the world are so fond of speedy travelling as the English; of course, the attention of breeders has been much directed to attain that particular shape most conducive to action. The Spaniards of the old school, who valued a horse in proportion to his susceptibility of the manœuvres of the riding-house, were accustomed to style those which excelled in such exercises, *hazedores*, or *doers*. We, of this country, emphatically distinguish by the appellation of *goers*,

those horses particularly endowed with our favourite qualification—speed.

The horses of this country had arrived at high perfection, in the admired qualities of speed and strength, individually, long before the present time. For instance, we have no reason to expect that the speed, strength, and continuance of Childers and Eclipse, as gallopers; of Archer, and one or two others, as trotters; or the powers of certain cart-horses, which have drawn such immense weights, and repeated so many dead pulls, will ever be excelled. It seems not to be within the compass of those powers of action by nature bestowed upon the horse, to gallop a mile in less time than a minute; or to trot the same distance in less than three minutes, bating a few seconds. But animals capable of such extraordinary exertions are rare, even in England.

Before we notice the various breeds of English horses, we shall give a general description, and various particulars to be strictly regarded by every purchaser of horses.

The head of a horse should be without flesh, and in length and size hold fair proportion with the size of his body; eyes full, and somewhat prominent; eye-lids thin and dry; ears thin, narrow, erect, of middling length, and nigh each other; forehead flat, not too large or square, and running nearly in a straight line to the muzzle, small and fine; nostrils capacious; lips thin; mouth of sufficient depth; tongue not too large; the jaw-bones wide at top, where they join the neck; the head not abruptly affixed to the extremity of the neck, but with a moderate curve and tapering of the latter.

The neck must be moderate, not too long, not thick and gross on the upper part, nor too large and deep, but rising from the withers or forehead, and afterwards declining and tapering at the extremity, of a curved form; underneath, the neck should be straight from the chest, not convex or bellying out.

The shoulders capacious, and so large as to appear the most conspicuous part of the body, with but little flesh; they should reach the top of the withers, well raised; the chest sufficiently full, not narrow or pinched.

The body deep and substantial; back, a plane of good width, but handsomely rounded; back-bone straight, or with a trifling inclination, and not too short; loins

wide, muscles of the reins, or fillets, full, and swelling on each side the back-bone; sufficient space between the ribs and hip-bones, the bones round, buttocks deep and oval; the rump level with, or little elevated above, the height of the withers; the croup must have reasonable space, and not sink suddenly, else the tail would be set on too low, which should be nearly on a level with the back.

The hind-quarters should spread wider than the fore-parts, and the hind-feet stand farther asunder than those before; the thighs should be straight, large, muscular, and of considerable length; the shank not too long, but flat, and of sufficient substance, its sinew large and distinct, the fetlocks long; the hocks wide and clean, and forming an angle so as to place the feet immediately under the flanks. The fore-arms, like the thighs, should be large, muscular, and of good length, the elbows not turning outwards; the knees large and lean; the shank or cannon-bone, flat, strong, and not too long; the tendon large; the fore-arm and shank nearly in a straight line; fetlock-joints large and clean; pasterns inclining, not too long, but large in proportion to their length; the coronary rings not thick or swelled, but clean, dry, and hairy; the feet neither too high, nor too flat, and in size of a sufficient base for the weight they have to sustain; hoofs, of a dark and shining colour, without seams or wrinkles, tough and strong, not hard like oak; foot internally concave, sole hard, but not shrunk, heels wide, and of middling height; frog not too large or fleshy, but tough and sound; the feet of equal size, should stand exactly parallel, so that the front, or toe, incline neither inward nor outward; the fore-feet should stand perpendicular to the chest, not too much under it, and they should be less wide apart than the fore-arms; the legs should not be loaded with hair.

The age of a horse is only determinable precisely by his teeth; which rule fails after a certain period, and even within that period is at times equivocal and uncertain. A horse has twenty-four double teeth, or grinders, four tushes, or single teeth, and twelve front teeth, or gatherers. Mares seldom have tushes. The mark, which discovers the age, is found in the front

teeth, next the tushes. In a few weeks, the foal's twelve fore-teeth begin to shoot; they are short, round, white, and easily distinguishable from the adult or horse's teeth, with which they are afterwards mixed.

At some period, between two and three years old, the colt changes his teeth; he sheds the four middle front teeth, two above and two below, which are after some time replaced with horse's teeth. At three years one on each side the former is changed; he has then eight colt's and four horse's teeth. After four years, he cuts four new teeth, one on each side of those last replaced, and has at that age eight horse's and four foal's teeth. These last new teeth called pincers, are slow growers; they are the corner teeth, next the tushes, and bear the mark, which consists in the tooth being hollow, the cavity having a black spot, resembling the eye of a bean. The tushes may then be felt.

From that time forward the horse's age can only be guessed from certain indications, usually made with tolerable accuracy by experienced people. If his teeth shut close, and meet even; are whitish, not over long, and his gums plump, you may conclude he is not yet nine years old. At that age, and as he advances, his teeth become yellow and foul, and appear to lengthen, from the gums shrinking and receding. The tushes are blunt at nine, but at ten years old the cavity in the upper tushes, until then to be felt by the finger, is entirely filled up. At eleven, the teeth are long, black, and foul, but generally meet even; at twelve, his upper-jaw teeth will overhang the nether; at thirteen, and upwards, his tushes will be either worn to the stumps, or long, black, and foul, (like those of an old boar.) Beside those, nature ever furnishes various signs of the approach of old age and decay, through the bodies of all animals.

After a horse has past his prime, his temples will be hollow, his muscles continually losing their plumpness, and his hair, that gloss and burnish, characteristic of youth and prime, will look dead, faded, or entirely lose its colour in various parts. In proportion to the excess of these appearances will be the horse's age.

THE RACE-HORSE.

The impatient courser pants in every vein,
And pawing, seems to beat the distant plain;
Hills, vales, and floods, appear already crost,
And ere he starts, a thousand steps are lost.

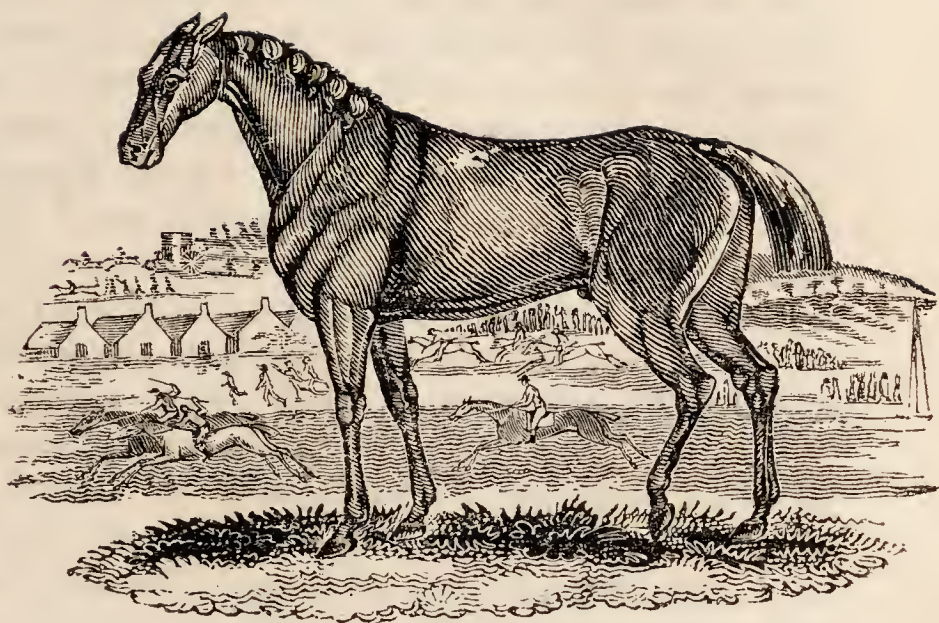
By judicious mixture, and by superior management, the English race-horse excels those of Europe, or, perhaps, the whole world. For supporting continued violent exertion (or *bottom*), they are superior to the Arabian, the Barb, or the Persian; and for swiftness they yield the palm to none.

The usual trial of speed, in English racing, is the distance of a single mile; of continuance, stoutness, or bottom, four miles. It has been asserted, but not proved, that flying Childers ran a mile over Newmarket in a minute, (a velocity almost incredible.) This distance, however, has been performed in a minute and a few seconds.

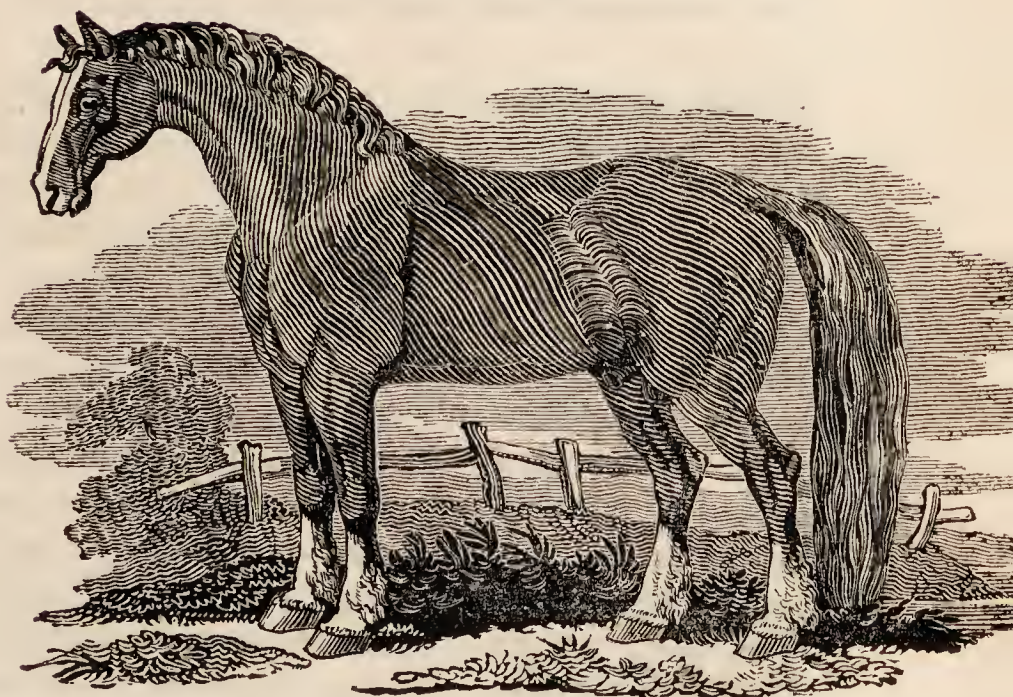
The distance of four miles was run by Childers, in 1721, carrying nine stone two pounds, in six minutes, and forty-eight seconds. This wonderful animal, upon level ground, leaped ten yards with his rider, and is supposed to have covered twenty-five feet at every stride, which is more than forty-nine feet in a second.

Bay Malton ran four miles at York, in 1763, in seven minutes, forty-three seconds and a half. This horse, in seven prizes, won the amazing sum of five thousand, nine hundred pounds. Eclipse ran the same distance at York, in eight minutes, with twelve stone. This fleet animal won kings' plates, and other prizes, to a great amount. A horse which, with eight stone seven pounds, will run four miles in eight minutes, will win plates. No attempt has hitherto been made to ascertain the number of miles an English racer would run in an hour: Hull's Quibbler ran twenty-two or twenty-three miles in an hour; but little is to be inferred from this instance, as Quibbler was but an indifferent racer, and the performance has been equalled upon the hard road by a three-part bred hack.

Highflyer was accounted the best horse of his time in England. The sums he won, and received, amounted to near nine thousand pounds, though he never started after five years old. He was never beaten, nor ever



Race Horse.



Black Cart Horse.

paid a forfeit. Matchem was a very quiet stallion, and may be said to have earned more than any other horse in the world. He died in his thirty-third year.

Shark won, besides a cup, value one hundred and twenty guineas, and eleven hogsheads of claret, the vast sum of fifteen thousand five hundred and seven guineas, in plates, matches, and forfeits. On the event of the celebrated match at Newmarket, in 1799, between Sir H. Vane Tempest's Hambletonian, and Mr. Cookson's Diamond, (won by the former), not less than two hundred thousand pounds were betted. The celebrated horse Regulus died in 1812. He was the sire of three thousand colts, that have produced upwards of eighty thousand pounds.

Horse-racing is of considerable antiquity in this island, and may be traced as far back as the eleventh century, but was not regularly pursued till the accession of the House of Stuart. Newmarket was frequented previous to the civil war, but in the reign of Charles II., encouraged by the monarch and his favourites, it shone forth in full splendour. At these headquarters of the turf, frequent meetings are held, at stated periods, and the sport continues through the week. At about eighty other places in England races are annually held; in some, twice in the year. At Newmarket, nearly all races are determined at one heat, as a measure of necessity, from their usual number and variety.

Fine and delicate horses, the natives of warm climes, excel in swiftness: the most perfect of these were, originally, found in Arabia, but they are improvable in their descendants; the Arabians tried in England have never proved equal upon the course to the English racers, their descendants. Though the general characteristic of thorough-blood is speed, yet the final test is continuance; as many common or half-bred horses have been known to possess racing speed, but in these no instance has ever occurred of its continuance beyond, perhaps, half a mile; the powers of continuance increase in proportion to the quantity of blood; thus, three-part bred horses will persevere longer than half-bred, and those descended from bred horses, and three-part bred mares, will sometimes equal the real racers.

The *training* of race-horses is, at present, a more simple and rational process than formerly, and is rapidly advancing towards perfection. Horses were formerly stuffed with baked bread, and loaded with a debilitating burthen of clothes; they had to breathe a suffocating and almost tropical heat, within doors, and were greatly oppressed with severe and long continued exercise. A contrary practice, however, is now adopted. The heaviest oats, and the hardest and sweetest hay, are given to the animal, and a free circulation of air is allowed in the stables. The race-horse spends his winter in the paddock and stable, enjoying himself at his ease, until the periods of physic and discipline arrive.

THE HUNTER.

So when the ring with joyful shouts rebounds,
With rage and pride the imprison'd hunter bounds:
He frets, he foams, he rends his idle rein;
Springs o'er the fence, and headlong seeks the plain.

THE hunter is a combination of the racer, with others of superior strength, but inferior fleetness and lineage. This is absolutely necessary, because to support the fatigues of the chase, requires the spirit of the one, and the vigour of the other.

THE OLD ENGLISH DRAUGHT-HORSE,

Is remarkable for its beauty, symmetry of form, and large size. Possessing singular strength for draught, this race affords an ample source of profit to graziers and breeders, and it is in high request in the counties of Lancaster, Leicester, Northampton, Lincoln, and a few other shires, to which they are suited.

This breed possesses much superior strength of constitution, hardiness, and bone, as every attention is paid to the corresponding points in both sires and dams. They come into use at two years old, and, if brought to a good size in proper time, produce handsome prices at the age of two or three years. They cannot be paralleled in any other country for strength, size, and activity, united. London furnishes horses able to draw, on level ground, for a short space, three tons, and they could, with ease, continue half that load.

The **DRAY-HORSE**, common in London and its

neighbourhood, is unequalled for size and fatness, but deficient in hardiness and energy. The farmers in Hampshire, and Berkshire, use these horses in their teams. Eastern princes (says Dr. Anderson) have their stables filled with stately elephants, for parade, because none else can afford to keep them; and wealthy London brewers, for the same reason, turn out these monstrous animals, day after day, to paw up the streets, and be gazed at, as a wonder, by the admiring multitude.

THE SUFFOLK PUNCH.

THE Suffolk punch sorrels are singularly useful for agricultural departments. The sandy land about Woodbridge has long been celebrated for producing this breed, generally the best cart-horses in England. They are of a bright sorrel colour, have low foreheads, large bodies, similar to cows, short legs, and ill-formed heads, but, notwithstanding their awkward appearance, they exceed every other race of draught-horses. Five of these horses drew thirty sacks of barley over the sandy road, from Walton to Ipswich; and a single horse has been known to draw, in a cart, ten sacks of flour, each twenty stone and a half, five miles, on a heavy road. They are of various sizes, but the smaller ones are, in general, the most serviceable.

THE CLYDESDALE HORSE.

THIS race, bred in Scotland, is strong, hardy, active, and calculated for hilly districts. They are lighter, and altogether more elegantly formed than the Suffolk punch. Their tread is firm, with considerable activity; and they are capable of exerting a wonderful degree of muscular strength for a short time. They can live upon very coarse food, and are well suited for the cart, or plough. The colour is brown, or grey; the legs are sinewy and clean; the eyes sprightly and animated; the head and body, light and well formed: and the height from fifteen to sixteen hands and a half.

THE CLEVELAND BAYS,

ARE bred in various parts of Northumberland, Durham, and in the district of Cleveland, Yorkshire, whence they have their name. They are large, and, for activity,

hardiness, and strength, superior to most horses. They are well formed, generally of a bay colour, and equally well suited for the coach or the plough.

THE NEW FOREST HORSE,

A DIMINUTIVE breed of horses, runs wild in the New Forest, and though, in general, the horse is private property, it is with difficulty ascertained. Many of the land-owners in the neighbourhood of the forest, have a right of common on it, and most of the neighbouring cottagers assume that right. Many have two or three mares, and some, whose business is to breed colts, have droves.

Herds of twenty or thirty are often seen feeding together; in summer especially, when they have plenty of pasturage, and can live as they please. In winter they separate, and seek food, though, in general, they are left, in all seasons, to take their chance in the forest. Where there is no expense, there can be little loss; and what is saved, is so much gained. In marshy parts, a severe winter often goes hard with them. But in dry grounds, where heath and furze abound, they pick up a tolerable winter subsistence; especially if they have learned the little arts of living, taught by necessity; one of the most useful of which is to bruise, and pound, with their fore-feet, the prickly tops of furze.

When colts, which have run wild, are to be caught for sale, their ideas of liberty are such, from pasturing in so wild a range, that it is no little difficulty to take them. Sometimes they are caught by sleight of hand, with a rope and a noose; but more commonly are they hunted down by horsemen, who relieve each other.

The colts which feed on Obergreen, are sometimes thus taken; a long bog, called Longslade-bottom, is crossed by a mole thrown over it, with which the colt is well acquainted: on being pursued, he is easily driven towards it, and when he is about the middle, two or three men start up in front, and oblige him to leap into the bog, where he is entangled and seized. At the neighbouring fairs, these horses are a principal commodity, and are bought up for every purpose suitable. Though diminutive, often half a dozen may be seen

straining in a waggon ; and it being fashionable to drive them in light carriages, their price is high. It is a little fortune to a poor cottager, to possess three or four colts, tolerably handsome and well matched.

The New Forest horse is said to be of Spanish ancestry, shipwrecked on the coast, in the time of the Armada. Though this account deserves little credit, yet some of them would not disgrace so noble a lineage. In general, however, the croup of the Forest horse is low ; and his head ill-set on, with what the jockeys call a *stiff-jaw*. Their claim, therefore, to high lineage must rest on good qualities more than beauty ; on their hardy nature ; uncommon strength ; on agility, and sureness of foot, perhaps acquired by constantly lifting their legs among the furze.

GALLOWAYS.

THE mountain ponies of Wales and Scotland, (in the latter country called galloways) though very small, are extremely hardy. The best seldom exceed fourteen hands and a half. Their eyes are lively and spirited ; their bodies firm, and legs nervous. They are too small for draught, and too little showy to appear well for saddle-horses ; but for carrying a person easily and expeditiously over rocky and mountainous roads, where provender is scanty, and accommodation bad, they have few equals among their species.

Dr. Anderson, when a boy, possessed one of these galloways, which, in elegance of shape, could scarcely be excelled ; and in disposition was, in the greatest degree, gentle and compliant. It moved almost with a wish, and never tired. He rode it five and twenty years, and twice in that time he rode one hundred and forty miles at a stretch, stopping only to bait, and then about an hour at a time ; and it came in, at the last stage, with the same cheerfulness and alacrity as it travelled the first.

A countryman, about sixteen stone, some years ago, was employed by the Laird of Coll, as a post to Glasgow or Edinburgh. Being once stopped at a toll-gate, near Dumbarton, he humorously inquired whether he must pay the toll, if *he* carried a burthen through the gate ; and being answered in the negative, he immedi-

ately dismounted, and bore his horse through on his shoulders.

THE SHELTIES.

THE general form of the Shetland ponies is elegant; and the body is thicker and more compact than that of a blood horse. The bones are very small, as is the head, and that part of the neck which joins it. The black kind are most hardy; and sometimes live to the age of thirty years. The Shetland pony is so diminutive, that a man of ordinary size and strength can easily lift one of them from the ground, and some are scarcely more than three feet high from the foot to the shoulder; yet so strong, as to carry a man of twelve stone a journey of forty miles in a day.

No animals show more strength and perseverance in travelling than our common road-horses, if not tried beyond their power. Many of them carry a full-sized man from fifty to seventy miles a day, several days in succession, if properly fed, and not hurried; but when a long journey is intended, the average rate of travelling should not exceed seven miles an hour. We have instances, however, of extraordinary fleetness in some well-bred road-horses. In 1745, the post-master of Stretton rode, on different horses, along the road, to and from London, two hundred and fifteen miles in eleven hours and a half, above eighteen miles an hour; and, in July, 1788, a horse was trotted, for a wager, thirty miles, in an hour and twenty-five minutes, above twenty-one miles by the hour.

The horse evidently receives satisfaction from pleasing and being useful, yet he is not unconscious of injury and injustice. He knows his benefactor, and his enemy, and will sometimes show his sense of both. Dennis, a baronet, one of whose hunters had never tired in the longest chase, once encouraged the cruel thought of attempting completely to fatigue him. Therefore after a long chase, he dined, and, again mounting, rode him furiously among the hills. When brought back to the stable, his strength appeared exhausted, and he was scarcely able to walk. The groom, possessing more feeling than his brutal master, could not refrain from tears, at the sight of such a noble animal thus sunk

down. The master, after some time, entering the stable, the horse made a furious spring upon him, and, but for the groom's interference, would certainly have despatched him.

An intelligent and observant person, in the former part of his life, keeping one horse, happened also, on a time, to have only one hen. These two incongruous animals spent much time together, in a lonely orchard, where they saw no creature but each other. By degrees, between these two sequestered individuals regard became apparent. The fowl approached the quadruped with notes of complacency, rubbing herself gently against his legs: while the horse would with satisfaction look down, and move with great caution and circumspection, lest he should trample on his diminutive companion.*

Of the extreme sagacity of the horse, many instances are recorded. A gentleman has many times seen a favourite hackney walking, from her paddock to the stable, through droves of young chicks and ducklings, lifting up her feet, laying her ears, and putting her nose almost to the ground, lest she should tread upon them. The same mare, trotting at full speed, once flew a rod out of her way, to avoid treading upon a child, accidentally crossing the road. This was not the effect of starting or shying, to which she was not addicted.† This mare also saved herself and master, at one Easter hunt, upon Epping forest, whither he had the curiosity to go: By the side of a waggon, he was riding slowly and heedlessly up the hill. The mare pricked her ears at a man and horse coming full speed down, exactly in her line of direction; and, at their approach, hung back, and instantly, with the dexterity of harlequin, stooped under the waggon-tail. A horseman behind, going very fast, received the mighty shock, which made the earth tremble.

* A cow lately attacked a little girl in a field; a horse pasturing at a little distance, came running to the child's relief, beat off the vicious cow, and escorted the defenceless girl to the gate of the enclosure!

† The brother-in-law of the Editor of these pages was, when a child, knocked down in a crossing in one of the streets of London, by the fore-horse of a team, and five horses passed over him without one of the animals setting foot on the prostrate boy. Till this day he has the most perfect recollection of each of the noble animals looking down upon him, and carefully stepping over him!

One horse was killed, and the shoulder of the other shattered to pieces.

If well managed, the horse will live forty or fifty years. One belonging to a field-officer, at the rebellion in Scotland, in 1715, died only in 1760; and there have been similar instances of longevity; though the general period of a horse's life is between twenty and twenty-five years.

The mare goes two hundred and ninety days with young: she suckles her foal with fondness, and defends it from injury with a mild, but firm resolution.

The horse is subject to various diseases; but these more frequently arise from ill treatment than from nature. The skin of the horse, when tanned, is made into harness, and often, under the name of cordovan, into shoes. The hair is employed for several useful purposes.

THE WEASEL.

ACTIVE and enterprising, though small, the weasel is distinguished by its slender and lengthened body, from all other carnivorous animals. Being diminutive and flexible, with loose articulations of the spine, it easily winds into the crevices of rocks, or burrows in the ground, in search of rats, moles, and other small quadrupeds. The weasel is endowed with strength, courage, ferocity, and also cunning and sagacity.

The prey of the weasel being precarious, the animal can subsist long without food. It immediately kills every thing within its reach, and does not satisfy the cravings of hunger till it has sucked the blood of its victims.

The English weasel ascends trees and high walls after its prey. In the farm-yards, or houses for poultry and pigeons, and among game, the weasel is particularly destructive, often killing many more than it eats, merely to suck the blood. Of eggs, they are particularly fond, and also of honey and fruit.

The animals of the weasel kind have small glands near the anus, whence continually exudes an unctuous matter very offensive in the weasel, polecat, and ferret; but which, from the civet cat, martin, and pine-weasel, affords an agreeable perfume.

The COMMON-WEASEL, (*viverra vulgaris*) has much elegance of aspect, and its motions are light and easy. Its length is about seven inches, besides two inches and a half of the tail. Its colour is a pale yellowish brown, and beneath white; below the corners of the mouth on each side is a brown spot: the ears are small and rounded, and the eyes black. It is found in the cavities and under roots of trees, as also in banks near rivulets.

The motion of the weasel on the ground consists of unequal and sudden springs. Whenever he ranges abroad, he seems very watchful that no attack is threatened. In robbing a hen-roost, he first seizes the young chickens; and when there are eggs, he sucks them with avidity. In return for these depredations, however, he is useful to the farmer by destroying rats, mice, and other vermin; and he also goes in pursuit of moles. To the hare and the rabbit he is a determined enemy; following and terrifying its prey into a state of absolute imbecility; when the hare making piteous outcries, gives itself up without resistance. The weasel seizes its victim near the head; the bite is mortal, though the wound is scarcely perceptible; a hare or rabbit thus bitten never recovers, but lingers some time and dies.

An eagle having pounced upon a weasel, mounted into the air with it; but was soon observed to be in great distress; the little animal had extricated itself so much from the eagle's hold, as to be able to fasten upon the throat, which presently brought the eagle to the ground, and gave the weasel an opportunity to escape.

In the warren at Wakefield Outwood, Yorkshire, a weasel was observed dragging along a young rabbit, it had just killed; and was watched to a burrow, the repository of its plunder, the mouth was then carefully stopped till a spade could be brought to dig it out; and on turning up the earth, there were found at the bottom of the hole, fourteen couple of small rabbits, which had all been conveyed thither by this voracious and destructive invader. The weasel plays the tiger among the smaller murine tribes; eighty field mice having been found in one weasel's nest.

Weasels have been so completely tamed as to exhibit every mark of attachment to their benefactors, and to

be as familiar as a cat, or a lap-dog. When asleep, the muscles of this little animal are in a state of extreme flaccidity, so that it may be taken up by the head, and swung, like a pendulum, backwards and forwards, several times, before it wakes.

Mademoiselle de Laistre had taken a weasel under her protection, which, far from having any predilection for meat in a state of putrefaction, always preferred that perfectly fresh. For a few days at first it was fed with warm milk; and afterwards with veal, beef, or mutton. It frequently fed from her hand, and seemed delighted with this manner of feeding. It was very fond of milk. "When I pour (says Mlle. de Laistre) some milk into my hand, it will drink plenty, but if I am not thus complaisant, it will scarce drink a drop. When satisfied, it generally goes to sleep: my chamber is its place of residence, and by perfumes I dispel its strong smell; it sleeps by day in a quilt, into which it gets by an unsewn place which it has discovered on the edge; by night, in a wired box or cage, which it always enters reluctantly, and leaves with pleasure. If set at liberty before my time of rising, after a thousand little playful tricks, it gets into bed, and goes to sleep in my hand, or on my bosom. If I am up first, it spends a full half hour in caressing me, playing with my fingers like a little dog, jumping on my head, on my neck, running round my arms and body, with a lightness and elegance I never beheld in any other animal. If I present my hands, at the distance of three feet, it jumps into them without ever missing. It shews much finesse and cunning to compass its ends, and seems to disobey certain prohibitions merely through frolic. During all its actions it seems solicitous to divert and be noticed; looking at every jump and turn, whether you observe it or not; and if its gambols be unnoticed, it ceases them, and goes to sleep; and even when awoke from sleep, it instantly resumes its gaiety, and frolics about as sprightly as before. It only shews ill humour, when confined, or teased too much; expressing its displeasure by a sort of murmur; very different from what it utters when pleased. Amidst twenty people, this little animal distinguishes my voice, seeks me out, and springs over every body to come at me. His play with me is most lively and

caressing ; with his two little paws he pats me on the chin with an air and manner expressive of delight ; this, and a thousand other preferences, shew his real attachment to me. When he sees me dressed for going out, he will not leave me, and it is with trouble I can disengage myself from him ; he then hides himself behind a cabinet, near the door, and jumps upon me as I pass, with so much celerity that I often can scarce see him.

“He resembles a squirrel in vivacity, agility, voice, and manner of murmuring. During summer he squeaks, and runs about all night ; but since the commencement of the cold weather, I have not observed this. Sometimes, when the sun shines, while he is playing on the bed, he turns and tumbles about, and murmurs for a while.

“From his delight in drinking milk out of my hand, into which I pour a little at a time, and his custom of sipping the little drops and edges of the fluid, it would seem that he drinks dew in the same manner. He seldom drinks water, and that only with great caution, and in defect of milk ; and then seems only to refresh his tongue once or twice : he even seems afraid of water. During the hot weather it rained often ; I presented some rain-water in a dish, and endeavoured to make him go into it, but could not succeed. I then wetted a piece of linen cloth in it, and put it near him, when he rolled upon it with extreme delight.

“One singularity in this charming animal is his curiosity ; it being impossible to open a drawer, or a box, or even to look at a paper, but the little creature also will examine it. If he gets into any place where I dare not permit him to tarry, I take a paper, or a book, and look attentively at it ; when he immediately runs upon my hand, and surveys with an air of curiosity, whatever I happen to hold. He plays with a young cat and dog, both of some size, getting about their necks, backs, and paws, without their doing him the least injury.”

The female weasel constructs a nest of straw, leaves, and similar materials, in some outhouse or decayed tree, and brings forth in the spring, at a litter, from four to six ; quite blind, but which very soon gain sufficient sight to follow their dam, and assist in her excursions.

THE STOAT.

Loving and loved, thy mistress' grief!
Thou couldst the unaccounted hours beguile,
And nibbling at her fingers soft,
Watch anxious for th' approving smile;
Or, stretching forth the playful foot,
Around in wanton gambols rove,
Or gently sip the rosy lip,
And in light murmurs speak thy love.

THE stoat, or ermine (*viverra erminea*) resembles the weasel in appearance and colour, but is considerably larger; the body measuring ten inches, and the tail five and a half: the tip of the tail is also constantly black, whatever be the cast of colour on the body: the stoat, in the Highlands, and north of England, becomes milk-white, and is called the white weasel; and instances are common of it appearing parti-coloured, or white in some parts, and brown in others; the change of colour not having been completed. Its smell is strong and unpleasant. Its agility is such, that it will fairly run down a rabbit. Persons living in the neighbourhood of warrens often see a stoat pursuing a rabbit by the scent, and hunting with its nose to the ground like a spaniel. When the rabbit is tired out, its enemy makes a sudden spring, and fixing upon the back of its prey, soon despatches it by sucking its blood.

The stoat, like the weasel, heaps together a quantity of food, which it does not touch till in a state of complete putrefaction. Its depredations among game are well known. The following well-authenticated instance affords an idea of the extent of the stoat's industry. A gentleman in the neighbourhood of Felton shot a stoat, which escaped into a hole in an old stone wall; he thereby was induced to explore its place of retreat; the first victims he found, were, a couple of well-grown leverets, unmutilated; a little further were two young partridges, also untouched, and a pheasant's egg unbroken; beyond these were the heads of two other leverets, and at the extremity of the hole, lay the little marauder himself, dead. How it had conveyed the pheasant's egg, without breaking, is difficult to conceive.

In England, the fur of the stoat is of little value, wanting the thickness, closeness, and whiteness of those

from Siberia. In Norway, the ermine lives among rocks; his skin is white, except the tail, which is tipped with black. The furs of Norway and Lapland preserve their whiteness better than those of Russia, which soon become yellowish, upon which account, the former are in great request, even at St. Petersburg. The ermine catches mice like a cat, and when practicable, carries off his prey. He is peculiarly fond of eggs, and when the sea is calm, he swims over to the islands near the coast of Norway, where are vast quantities of sea-fowls.

It is alleged that when the female brings forth on an island, she conducts her young to the continent, upon a piece of wood, piloting it with her snout. This animal, though small, kills those which are much larger, as the reindeer and bear.—He jumps into one of their ears when they are asleep, and adheres so fast by his teeth that the creatures cannot disengage him. He also surprises eagles, and heath-cocks, by fixing on them, and never quitting them, even when they mount in the air, until the loss of blood makes them fall down.

THE COMMON MARTIN.

THE martin (*viverra foina*) has a highly elegant appearance, and is common in some of the southern parts of Great Britain and Ireland. It usually lives in a decayed tree, but in mountainous countries, as in Wales, it resides only among the rocks. The general length, from nose to tail, is about a foot and a half, and the tail is ten inches. This animal is of a blackish tawny colour, with a white throat, and the belly is of a dusky brown; the tail is bushy, and of a darker colour than the other parts; the ears are moderately large and rounded, and the eyes lively.

The martin lives in the woods, and, in winter, often shelters itself in a magpie's nest, it breeds in a hollow tree, and brings from four to six young ones at a time. The female has but little milk, but this she compensates by bringing home eggs and live birds to her offspring. When the young are able to quit their nest, the dam conducts them through the woods, and inures them to a life of carnage and plunder.

The martin, taken young, is easily tamed, and proves extremely playful and good humoured. But its attach-

ment is not to be relied on, if loose, for it will immediately take advantage of its liberty, and retire to its natural haunts in the woods. A farmer, of Terling, in Essex, was noted for taming this animal, and had seldom less than two. Some years since, a martin run tame about the kitchen of the Bald-faced Stag Inn, on Epping Forest.

A martin which Buffon took very young, and tamed, was fond of honey, and preferred hemp-seed to any other grain; it drank frequently; it slept sometimes two days without intermission; at other times it would keep awake for that or a longer period. Before it went to sleep, it coiled itself in a round position, and covered its head with its tail. While awake it was perpetually in motion, and sprang eagerly upon mice or poultry that came within reach of its chain.

Poultry, game, and small birds form the martin's common food: it will eat mice, rats, and moles, also grain, and is extremely fond of honey. The martin has a great antipathy to the feline race, and will attack and vanquish the wild cat, which is greatly superior to it in size and strength. It generally goes out in search of its prey, in the dusk of the evening, or during the night.

The martin is the best animal to enter young fox-hounds, as the scent is very sweet to hounds. By running through the thickest bushes, it teaches hounds to run cover, which is of infinite service. When closely pursued, it climbs a tree, and its agility is astonishing, for though it falls frequently from a tree into the midst of a pack of hounds, each intent on catching it, seldom is it caught by them in that situation. The martin is a determined enemy to the pheasant, which it constantly attacks while at roost; but it compensates for this by destroying many rats, mice, moles, and other small vermin.

The skin and excrements of this animal have an agreeable, musky scent, free from that disgusting rankness which distinguishes the polecat, and other species of this genus. The fur is valuable, and much used to trim the gowns of aldermen, and other magistrates. In some countries, the flesh is considered a palatable food.

THE PINE-MARTIN.

THE pine-martin (*viverra martes*) in size and shape resembles the common martin, but differs in the colour of the hair on the neck and breast, which, in the martin, is white, and in the pine-martin yellow; the fur of the upper parts of the body is darker, but the lustre is much less brilliant, and its head is shorter than that of the common martin. It is much less common, and continues in the woods and fields, not visiting the habitations of man. It often usurps the nest of the squirrel, or the buzzard, to breed in, sometimes dislodges the woodpeckers from their holes, and brings forth seven or eight young at a litter. It is chiefly found in the woody and thinly inhabited districts of Wales and Scotland; and, occasionally, in some of the northern counties of England. The pine-martin issues forth at night in search of food, and, like the common martin, devours numbers of squirrels, hares, and mice. When stimulated by long abstinence, it will fasten upon a lamb, or sheep; and when it meets the wild cat, it is sure to combat and vanquish this ferocious animal. Instances are given of pine-martins being so domestic as to walk about the house, and associate with a dog, for a companion, playing with it as cats sometimes do.

The fur of the pine-martin is considered superior to that of the former species, and the skins form a great article of commerce: those found about Mount Caucasus are esteemed finer than any others: in these the throat is of an orange colour. The part of the fur most esteemed is that along the back, from the neck to the extremity of the tail. Pine-martins are found in great abundance in the northern districts of America.

THE POLECAT.

THE polecat (*viverra putorius*), unlike the animal just described, seeks with confidence the habitations of man; mounts the roofs of houses, and resides in the corners of barns and outhouses; whence he issues, under the cover of night, to commit his depredations on the eggs and poultry of the farm-yard. He makes less noise, but is more mischievous than the martin. His activity is surprising, and when preparing to take a

spring, by arching his back, he greatly increases the force of his body. The general length of the polecat is seventeen inches, and the tail is about six inches. Its colour is deep blackish brown, with a tawny cast, slightly intermixed. The ears are edged with white, and also the space round the muzzle.

The polecat commonly forms a subterraneous retreat, beneath the roots of large trees, or under hay-ricks, and in barns. It preys on smaller animals indiscriminately, and is very destructive to poultry; like the ferret, it is a cruel enemy to rabbits, which it destroys as the weasel, stoat, and martin. It steals into barns, pigeon-houses, and other buildings, and commits great havoc, biting off the heads of fowls and pigeons, and then carrying them to its retreat; though sometimes it carries off only the heads. During summer it mostly frequents rabbit-warrens, or the hollow trunks of trees, and prowls about in quest of young birds, rats, field-mice, and other prey. A single family of polecats is sufficient to destroy a whole warren of rabbits.

The polecat, being fond of milk, will visit the dairy to indulge it; and it has been known to attack beehives in winter, and feed on the honey.

This animal also preys occasionally on fish, and will take up its residence in the hollow banks of rivulets, to lie in wait for its prey. During a severe storm, a polecat was traced in the snow from the side of a rivulet to its hole, at some distance: as it appeared to have made frequent trips, and other marks appearing in the snow, not easily to be accounted for, it was thought a matter deserving more diligent inquiry; therefore its hole was examined, the animal was taken, and eleven fine eels were discovered to be the fruits of its nocturnal excursions; the unusual marks in the snow having been made by the motion of the eels while dragged along in the animal's mouth.

The polecat breeds in the spring, and produces three or four at a birth, which she suckles but a short time, using them early to suck the blood of the animals she brings them, as well as eggs, and other food, obtained in her predatory excursions.

As the polecat will breed with the ferret, it is a practice with warreners, who keep these animals, to procure

a mixed breed from time to time, which are of a colour between the ferret and the polecat, or of a dingy yellowish brown.

The smell of the polecat is proverbially fetid, being furnished, like several others of the weasel tribe, with certain receptacles which secrete a thickish peculiarly strong and offensive fluid, which, when the animal is heated or irritated, is smelt at a considerable distance. The fur, however, is beautiful, and the skin, when properly dressed, is numbered among commercial furs, and used for tippets, and other articles of dress. The furriers endeavour to obtain skins taken from animals killed during the winter, as much less fetid than those killed in the spring and summer.

LECTURE LXIV.

THE HARE.

So have I seen some fearful hare maintain
 A course, till tir'd before the dog she lay;
 Who, stretch'd behind her, pants upon the plain,
 Past power to kill, as she to get away;
 With his loll'd tongue he faintly licks his prey;
 His warm breath blows her fur up as she lies;
 She trembling creeps upon the ground away,
 And looks back on him with beseeching eyes.

DRYDEN.

THE hare is one of the most innocent and most timid of quadrupeds. When disturbed, while feeding, it flies at the slightest alarm; but when seated in its form, it will allow itself to be approached so near as to be reached by a stick, seeming to be fascinated by fear; and, instead of endeavouring to fly, continues to squat immovable, with its eyes fixed on its enemy. To conduct this manœuvre, however, it is necessary to approach in a gradual and circling manner.

The fore-legs of the hare (*lepus timidus*) being the shortest, it always runs swifter up hill than on even ground; hence, when pursued, it generally takes to rising grounds. It frequently keeps all day in its form,

and only goes abroad to feed by night. Its eyes are prominent, to see behind and before; and, if disturbed, it will return, after various doublings, to the place whence it set out. The voice of a hare is never heard, except when seized or wounded; when it much resembles the cry of an infant. It sometimes becomes quite white, in severe winters.

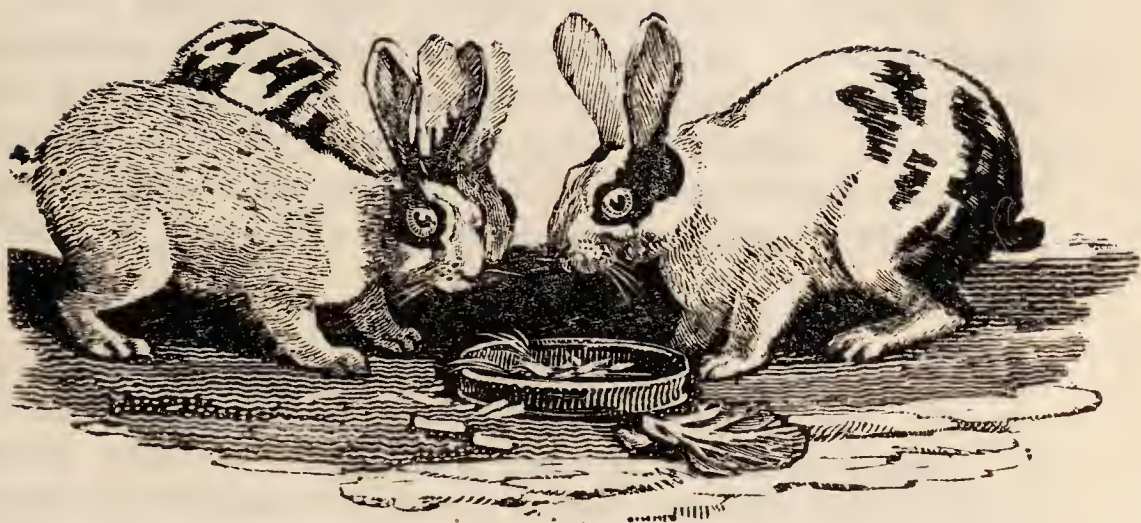
Hares breed several times in the year; the female, after suckling her young about three weeks, leaves them to provide for themselves. They are supposed to live about seven years, and the males much longer than the females. They pass their lives in solitude and silence, except occasionally assembling by moonlight, to sport together, when supposed safe from annoyance. But a falling leaf disturbs them, and instead of seeking security in union, they scamper off in different directions. Their pace is a kind of gallop, or quick succession of leaps; and they are so extremely swift, and possess so many arts of eluding pursuit, that they often escape their enemies. Such is their swiftness that one has been known to run four miles in twelve minutes, and to support a race of twenty miles for two hours.

The hare is preyed upon by foxes, wolves, eagles, hawks, and kites; which, together with the more destructive pursuits of mankind, contribute to reduce the number, else, from their prolific nature, they would multiply to a most extravagant degree. A Suffolk gentleman, in 1798, being obliged to destroy his hares, near some new plantations, the amount known to have fallen victims was one thousand and eighty-two. These animals are very numerous in some districts on the continent. In two days shooting at a chateau in Bohemia, in 1788, near eleven hundred hares were killed.

The hare is not destitute of docility, and has frequently been kept in the house and rendered very familiar. It has been known to keep company, and to sleep on the same hearth with a greyhound and a spaniel.

The amiable Cowper domesticated three of these animals. His own account of the circumstance, though somewhat long, is extremely pleasing, and communicates much useful information.

The fur of the hare is employed much in the manu-



Rabbits.



The Hare.

facture of hats. Its flesh was esteemed a delicacy among the Romans, but forbidden by the early natives of Britain, and now prohibited by Jewish and Moham-medan laws.

The varying hare (*lepus variabilis*) inhabits the summits of the Highland mountains. It exchanges the grey coat for a white one, about the month of September, and becomes again grey in April. In Siberia and Russia they are found in great abundance, and flocks of five or six hundred may be seen together.

THE RABBIT.

THE rabbit (*lepus cuniculus*) is not a native of Britain, but was introduced from other countries. Its general residence is in dry, chalky, or gravelly soils. It much resembles the hare, but is considerably smaller; and its fore-feet are furnished with longer and sharper claws, enabling it to burrow in the ground, and to form convenient retreats for concealment by day, and, like the hare, it comes out to feed chiefly by night, and during the early part of the morning.

Rabbits are plentiful in Lincolnshire, Norfolk, Suffolk, and Cambridgeshire, whence immense numbers are brought to supply the London market. In Yorkshire there are many warrens, and the skins of the rabbits are in great request for the hat manufactories of London and Manchester. The flesh of the rabbit is best when there is a choice of food in the fields which surround the covers, which is not the case with warrens. Until late years, the grey rabbit was the only species; at present, the silver-haired rabbit is sought after, and has recently been introduced into most warrens. The skin of the grey rabbit is cut from the pelt, for the manufacture of hats; but that of the silver-haired one is dressed as fur, exported principally to China and the East Indies. The colour is a black ground, thickly interspersed with single white hairs.

The rabbit lives eight or nine years, and goes with young about thirty days. It is a prolific animal, and has been known to breed seven times in a year, and to produce eight young each time. Rabbits will breed at six months old; and, supposing that they breed seven times annually, and have five young ones each

time, and that three of each kindle are females, in four years, there would be the enormous number of four hundred and seventy-eight thousand and sixty-two !

In consequence of the male's unnatural dislike to its offspring, the doe frequently kindles out of the warren. She scratches a small burrow, about two feet deep, where she prepares a bed for her young, composed of some blades of grass, and the fur plucked from her body, closing the earth artificially with her hind parts, when she leaves the nest to procure food. She suckles her young six weeks ; but when half this is expired, she conducts her young to the warren, where they are caressed by the buck.

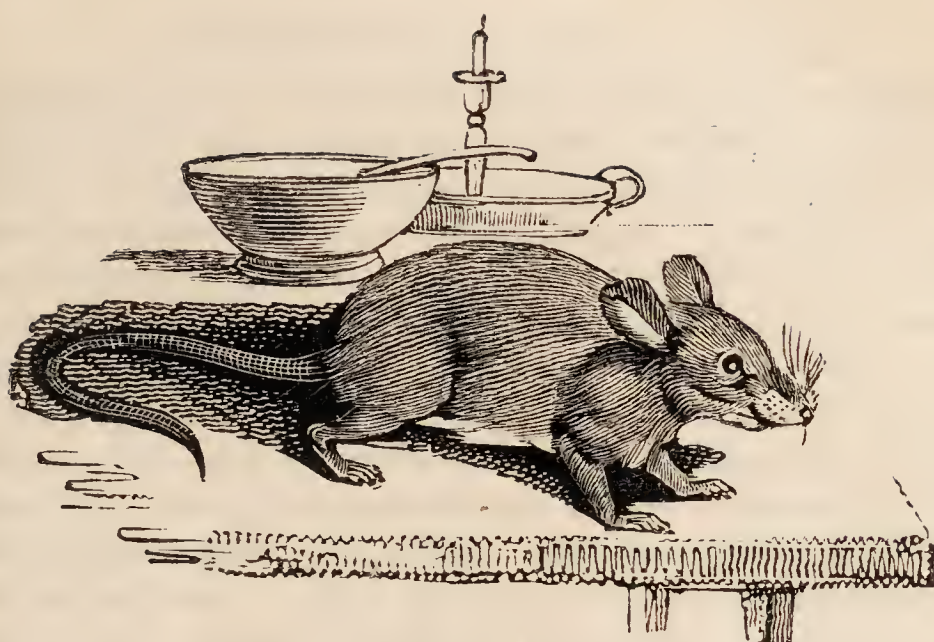
THE RAT.

OF the forty-one species, which this genus of animals comprises, three are natives of Britain, viz. the black rat (*mus rattus* L.,) the brown or Norway rat (*mus decumanus*,) and the water rat (*mus amphibius*.) Each species is very prolific, and all are distinguished by irresistible voracity.

THE COMMON BLACK RAT,

THOUGH common in Europe, is supposed to have been introduced from India and Persia : its head and body are seven inches long ; the back is of a blackish grey, and the lower parts of an ash colour ; the legs are slightly covered with dusky hair ; and the tail, which is usually six or seven inches, is thin, and scaly, marked with numerous rings. Their numbers have considerably decreased, since the introduction of the brown, or Norway rat, which in some countries has completely exterminated them. The female has ten teats, and brings forth several times in the year, generally six or seven at a litter. Dr. Shaw relates, that sometimes they increase so rapidly as to overstock the place of their abode, in which case they fight and devour each other ; which circumstance is the reason why these animals, after being extremely troublesome, suddenly disappear.

The common rat inhabits barns, granaries, and dwelling-houses ; where the females construct nests of various soft substances, for their young, and provide them immediately with food. On their first quitting their



The Mouse.



The Rat.

holes, the young rats are carefully watched by their dams, which protect them, and will even encounter cats in their defence.

THE BROWN OR NORWAY RAT.

Is larger than the common black rat, and measures nine inches from the head to the tail, which is naked and scaly, consisting of about two hundred rings, and is also from seven to nine inches long. The upper parts are of a tawny grey or ash-colour; but the under whitish; and, like the common black species, it has four toes on the fore feet, with a claw in the place of a fifth.

Though named the Norway rat, it is a native of Persia and India, and was introduced into Europe by ships returning from those countries: it first appeared in England about eighty years ago, and has nearly extirpated the black rat. This species is uncommonly prolific, and breeds several times in the year, producing from twelve to twenty at a litter. When unable to procure food from a particular spot, they migrate in large companies to towns and villages. In summer they are amphibious, and reside chiefly in holes on the banks of rivers, ponds, and ditches; but on the approach of winter, they frequent farm-houses and granaries, enter the corn-stacks and barns, and commit the most vexatious depredations. From old houses it is impossible to extirpate them; and to the destructive attacks of these *carnivorous* animals, rabbits, hares, and poultry, wool, stuffs, and furniture, fall a prey. They would speedily destroy the fruits of the earth, and of human labour, was not their baneful increase counteracted by numerous enemies among other animals, as well as by eating each other. An old rat is dreaded by its own species, as much as the whole race is by other creatures their natural prey. In fact, every animal devoid of superior strength must submit to the Norway rats; and in Ireland they have almost exterminated the whole race of frogs, which had been purposely introduced to assist in destroying insects. When the means of subsistence become scarce, these voracious animals prey upon their own species; the stronger dispatch the weaker, lay open their skulls, eat up the brains, and then the rest of the

body; nor do they suspend their havoc until the majority are destroyed.

All the stronger carnivorous animals have a natural antipathy to rats. Dogs, cats, and weasels, with alacrity pursue and attack them with animosity; but the weasel is the most formidable and invincible antagonist. Sometimes, however, the rats sell their lives dearly: they attack a small dog, seize him by the lip, and inflict a deep wound, not easily admitting of cure. Their depredations are equally destructive on ship-board. When the *Valiant* man-of-war returned from the *Havannah*, in 1766, these vermin had so increased, that they devoured daily one hundred weight of biscuit: at length they were suffocated, and, for some time, six hampers were filled daily with the rats thus destroyed.

Various expedients are employed for their extermination, but such is their cunning that it is difficult to entrap them, or allure them to swallow poison. Among these, if a rat be caught and a bell be then tied round its neck, and the animal set at liberty, it will drive away the rest wherever it goes. A gentleman travelling through Mecklenburgh, witnessed the following curious circumstance in the post-house at New Stutgard. After dinner the landlord placed on the floor a large dish of soup, and gave a loud whistle. Immediately there came into the room, a mastiff, a fine Angora cat, an old raven, and a remarkably large rat, with a bell fastened to its neck. The four animals went to the dish, and without disturbing each other fed together; after which the dog, cat, and rat, lay before the fire, while the raven hopped about the room. The landlord, after accounting for the familiarity existing among the animals, informed his guest that the rat was the most useful of the four; for the noise he made had completely freed the house from the rats and mice with which it was before infested." *

On the continent, a sponge is fried with salt-butter in a pan; then compressed between two plates, cut into small pieces, and scattered about the holes frequented by rats and mice; they devour it with avidity, it excites

* Shaw's "General Zoology," vol. II. Part I. p. 53.

thirst in the animals, which is gratified by water put in shallow vessels. On drinking, after eating the burnt sponge, their stomach distends, and the repast proves fatal.

A capacious cask, of moderate height, is put near places infested with rats; the first week, this is employed to allure them to visit its solid top, by means of planks sloping to the floor, and every day strewed with oatmeal, or any food equally grateful. Having been thus lulled into security, and accustomed to find a regular meal, for the wooden top of the cask a skin of parchment is substituted, and is cut for several inches transversely through the centre, to yield on the smallest pressure. Then water, to the depth of five or six inches, is poured into the empty cask. In the middle of this element a brick or stone is placed an end, to project one or two inches above the fluid, on which one rat may find a place of refuge. These preparations being made, the boards and top of the cask are furnished with proper bait, to induce them to repeat their visits. As soon as one of these marauders plunges through the section of the parchment into the vessel, it retreats to the brick, and commences its lamentations for relief. Its whining notes are regarded; others soon follow, and share its fate; now begins a dreadful conflict, to decide the possession of the dry asylum. Battles follow in rapid succession, attended with such loud and noisy shrieks, that all the rats in the neighbourhood hasten to the fatal spot, and experience similar disasters. Thus hundreds may be caught; and the effect of the stratagem might be greatly facilitated, by exposing a living rat.

No rats were seen in North America until conveyed thither in the ships which carried out the European settlers: their numbers have now so increased, as to be a serious evil to the colonists. Their depredations, particularly in the maize plantations, are occasionally very great indeed.

THE WATER RAT.

THE water rat has a blunt thick nose, is less than the brown, but larger than the black species; its ears are hid in fur, its head and body are covered with long black and ferruginous hair; and the tip of its tail has a

little white. It is a native of Europe, the North of Asia, and America. In form it much resembles the beaver or otter, and is extremely dexterous in diving and swimming. It burrows in the banks of rivers, ponds, and ditches; and feeds on fry and small fishes, frogs, insects, and roots. As a swimmer and diver, it excels: but in pursuit of its prey, it is often snapped up by the more voracious pike; probably these animals bring forth frequently in the year, but of this we have no certain information. Their flesh is not absolutely bad; and in Catholic countries the peasants eat it during Lent, as they do that of the otter.

THE OX.

— — — — — In the middle droops
 The strong laborious ox, of honest front,
 Which incompas'd he shakes; and from his sides
 The troublous insects lashes with his tail,
 Returning still. — — — — —

THIS general term includes black cattle in general, without regard to age or sex. The ox tribe (*bos taurus*) is thus distinguished: the horns, hollow and smooth, bend out laterally, or are lunated, and the skin along the lower side is pendulous; a few varieties, however, are *polled*, or without horns. The colours vary extremely, reddish, white, black, grey, dun, and spotted; the face is often white, while the body is of a different colour; in short, like all animals long domesticated, and whose breeds have frequently been mixed by crossing, both the form and the colour vary.

Few species of this tribe appear really distinct; but great is the number of varieties from the difference of climate, domestication, and other causes. In a wild state, the ox tribe are exceedingly wild and savage; though few are altogether incapable of being domesticated.

Formerly, the ox constituted the whole riches of man, and he forms now the basis of national riches, which subsist and flourish only in proportion to the cultivation of their lands, and the number of their cattle; for in these all real wealth consists; every other kind, even gold and silver, being only fictitious representatives, having no value but what is conferred on them by the

productions of the earth. To man, then, the ox tribe is most valuable; some, trained to labour, draught, and burthen, supply the place of horses, while their flesh and milk afford nutritious food, and their hides are employed in various domestic purposes.

Naturalists now agree that the ox is, in fact, the bison domesticated. The bison inhabits the marshy forests of Poland, the Carpathian mountains, and Lithuania, also the vicinity of Mount Caucasus, in other parts of Asia, and in the new world. In its native savage state, it is distinguished by size, and also superior depth and shagginess of hair, which, about the head, neck, and shoulders, sometimes almost touches the ground; the horns are rather short, sharp-pointed, extremely strong, and stand distant from their bases like those of the common bull: the colour is sometimes a dark blackish brown, and sometimes rufous brown; the eyes are large and fierce, the limbs extremely strong, and the whole aspect in the highest degree savage and gloomy.

By the lapse of ages, modified treatment, and various other causes, the bison has become divested of his ferocious qualities; and the ox tribe is, in this country, divided into very numerous varieties, hereafter described, each differing widely from the other in size, form, and colour.

WILD CATTLE.

———— Tossing the foam,
They scorn the keeper's voice, and scour the plain,
Through all the bright severity of noon;
While from their labouring breasts, a hollow moan
Proceeding, runs low-bellowing round the hills.

THREE centuries ago Scotland contained a wild race of cattle, of a white colour, with manes like lions. In the parks of Drumlanrig, in Scotland, and of Chillingham, near Berwick-upon-Tweed, are still herds of cattle, probably derived from this savage breed, which had lost their manes, but retained their colour and fierceness. However, of this curious race, only these are still to be seen in all their native wildness. Their colour is invariably of a creamy white; muzzle black; the whole inside of the ear, and one-third of the outside,

from the tips, red ; horns white, with black tips, very fine, and bent upwards ; some of the bulls have a thin upright mane, an inch and a half or two inches long. The oxen weigh from thirty-five to forty-five stone, and the cows from twenty-five to thirty-five stone, the four quarters (fourteen pound to the stone.)—The beef is finely marbled, and of excellent flavour.

From their pasture, and frequent agitation by the curiosity of strangers, it is scarcely to be expected they should get very fat ; yet the six years old oxen are generally very good beef, whence it may be supposed that in proper situations they would feed well.

When a person first appears, they set off in full gallop about two hundred yards, then wheel round and come boldly up again, tossing their heads in a menacing manner ; on a sudden, at forty or fifty yards distance, they make a full stop, look wildly at the object of their surprise, but on the least motion they all again turn round, and fly off with equal speed, yet not to the same distance, forming a shorter circle, and again returning with a bolder and more threatening aspect ; they approach nearer, within about thirty yards, again make stand, and again fly off ; this they do several times, gradually shortening their distance till they come so near, that most people think it prudent to leave them, not choosing to provoke them further.

The mode of killing them is perhaps the only modern remains of the grandeur of ancient hunting. On notice being given that a wild bull would be killed on a certain day, the inhabitants of the neighbourhood came, mounted and armed with guns, &c. sometimes to the amount of an hundred horse, and four or five hundred foot, who stood upon walls, or got into trees, while the horsemen rode off the bull from the herd until he stood at bay, when a marksman dismounted and shot. At some of these huntings twenty or thirty shots have been fired before he was subdued. On such occasions, the bleeding victim grew desperately furious, from the smarting of his wounds, and the shouts of savage joy echoing from every side. But from the number of accidents that happened, this dangerous mode has been little practised of late years, the park-keeper

alone generally shooting them with a rifled gun at one shot.

The cows hide their calves a week or ten days in some sequestered situation, and go and suckle them two or three times a-day. When any person comes near the calves, they clap their heads close to the ground, and lie like an hare in form, to hide themselves; this proof of their native wildness is corroborated by a circumstance that happened to Mr. Bailey, of Chillingham. He found a hidden calf, two days old, very lean and weak: on stroking its head, it got up, pawed twice or thrice, like an old bull, bellowed loud, stepped back a few steps, and *bolted* at his legs with all its force; it then again pawed, bellowed, stepped back, and bolted as before; but knowing its intention, and stepping aside, it missed him, fell, and was so very weak, it could not rise, though it made several efforts: but it had done enough: the whole herd were alarmed, and, coming to its rescue, obliged him to retire; for the dams will allow no person to touch their calves, without attacking them with impetuous ferocity.

When a calf is to be castrated, the park-keeper marks its hiding place, and, when the herd are at a distance, takes an assistant with him on horseback; they tie a handkerchief round the calf's mouth to prevent its bellowing, and then, as expeditiously as possible, perform the operation in the usual way. When any one happens to be wounded, or is grown weak and feeble through age or sickness, the herd set upon it and gore it to death.*

THE DEVONSHIRE BREED.

—————On the grassy bank
Some ruminating lie; while others stand
Half in the flood, and often bending sip
The circling surface.

THIS breed bears a closer affinity to the wild race than any other: it is in the greatest purity, and of the best kind in the neighbourhood of Barnstaple. The horns are of a middle length, bending upwards; the colour varies from a light to a very deep red, with a light dun ring

* Cully on Live Stock, p. 73, 78.

round the eye, and the muzzle the same. If any white spots appear, except on the tip of the tail, the graziers consider the breed as impure, particularly if those spots blend. These cattle are thin in the face, fine in the chops and bone, clean in the neck, and wide in the hips: the skin is thin and silky in handling: the back is straight, the tail small, and set on very high.

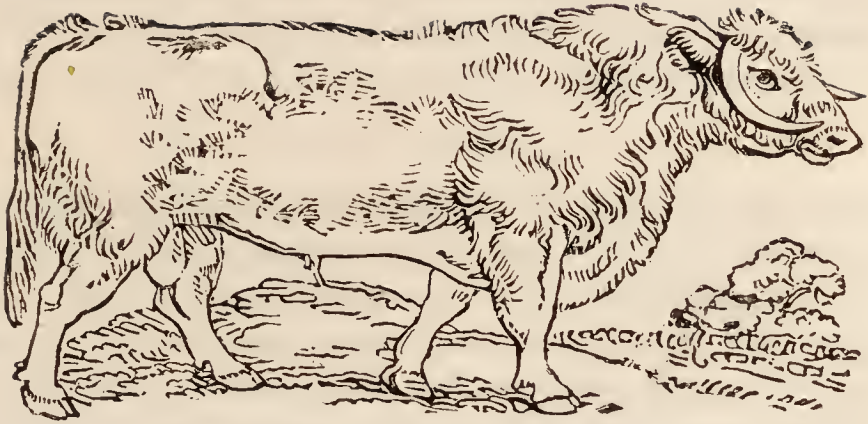
The Devonshire breed is one of the handsomest, and most profitable reared in Britain. They fatten soon on the most valuable parts, and are admirably fitted for draught; and though small in size, they amply compensate by their hardiness and agility. The Devon oxen mostly are yoked at three years old, and lightly worked; their labour is increased at four, and to six they are fully worked: and such worked oxen attain a larger size than those not worked: and at six years old they mostly finish their growth.

In excellence of beef, the Devonshire oxen can scarcely be exceeded: and they will bear driving to London, sometimes without the smallest waste, a distance considerably above one hundred miles. Their thin skin, it improves much in tanning: the tallow is peculiarly good; * it has generally commanded the best prices at Smithfield for a century past.

THE HEREFORDSHIRE BREED.

THE Herefordshire breed, though evidently mixed, is generally understood to have originated in the Devonshire stock; and though of great size and weight, their bones are uncommonly small. Their colour is a dark red; hair fine; head and neck clean, and the face bald or spotted; the horns bright, taper, and spreading; chest deep, and bosom broad; the hips, rump, and sirloin wide, thighs thin, legs sometimes white or spotted, back straight and small boned. This is confessedly one of our most valuable breeds: it is found chiefly in the county whence it is named, and also in other parts of England. In size they vary, but require good keep: the oxen are most powerful for draught, yet have sufficient speed for work either at plough or cart, and generally walk as quick as their attendants wish. Their

* Brit. Quad. p. 402.



Long-horned Ox.



A Cow Herd.

meek and placid countenances indicate docility and tractability, and if trained with temper and kindness, they will drive to an inch with reins. But their distinguishing qualities are, the produce of beef, quick feeding in proportion to their growth and size, and the union of strength and speed in labour. For the most profitable return in quantity of beef, no other breed can stand in competition; they have accordingly been most successful at the annual prize shows for cattle; and they also command the first prices, whether alive or dead.

THE SUSSEX BREED,

LIKE the Herefordshire, is mixed, though of the Devonshire race. The Sussex cattle are in high estimation for beef and labour, and also for their quantity of milk; they are of various sizes, are mostly very flat and deep, of a brown or deep red colour; the horns are of a middle length, the points turning upwards and backwards. In speed they equal, if they do not exceed, the parent or Devonshire race; and are adequate to the cultivation of the deepest roads: though generally placid, they are rather quick in temper, like the Devons.

The calves run with the cows till they are eleven or twelve weeks old, when they are weaned and turned to grass. A good cow, after the calf is taken from her, if well kept, will produce from six to eight pounds of butter per week, for three or four months after taking off the calf, and double that quantity of skimmed milk cheese. Though they yield less milk than the Suffolk cattle, yet it is of richer quality. The Sussex oxen are mostly worked from three to six years old, sometimes to seven, when they are turned off for feeding.

The Sussex breed, when fattened, attain a very considerable size; an instance of which occurred at Barcombe. A bullock, upon which a wager had been laid equal to its value, was slaughtered, on Wednesday, June 8, 1814, and weighed the following morning, in the presence of many interested in the decision. Never was the fallacy of professed judgment more exposed, as this beast had been visited, viewed, and handled, from March to June, by at least three hundred persons of the soundest experience, and of considerable celebrity for profound knowledge of the weight and value.

of live stock. He had been taken from the yoke in rather low condition, and immediately put upon fattening food about the end of the preceding January, when the bet was made; and it was generally admitted that he could not exceed 120 stone; but after being slaughtered, his weight was 171 stone 11 lbs., near twenty stone heavier than any one had ventured to estimate him at; and by which it appeared that, in the short space of four months, this ox had gained *fifty-one stone of flesh!*

THE OLD GLOUCESTER REDS AND BROWNS.

THIS breed is middle-horned, shewing *blood*, and exhibiting some resemblance to the South Devon. They are a mixed breed, possessing much Welch blood, and appear to have been more disposed to take on fat, than to give milk. Having given way to the long-horned species in that dairy country; it would now be difficult to find any genuine specimen of this old variety.

THE KENTISH HOMEBREDS.

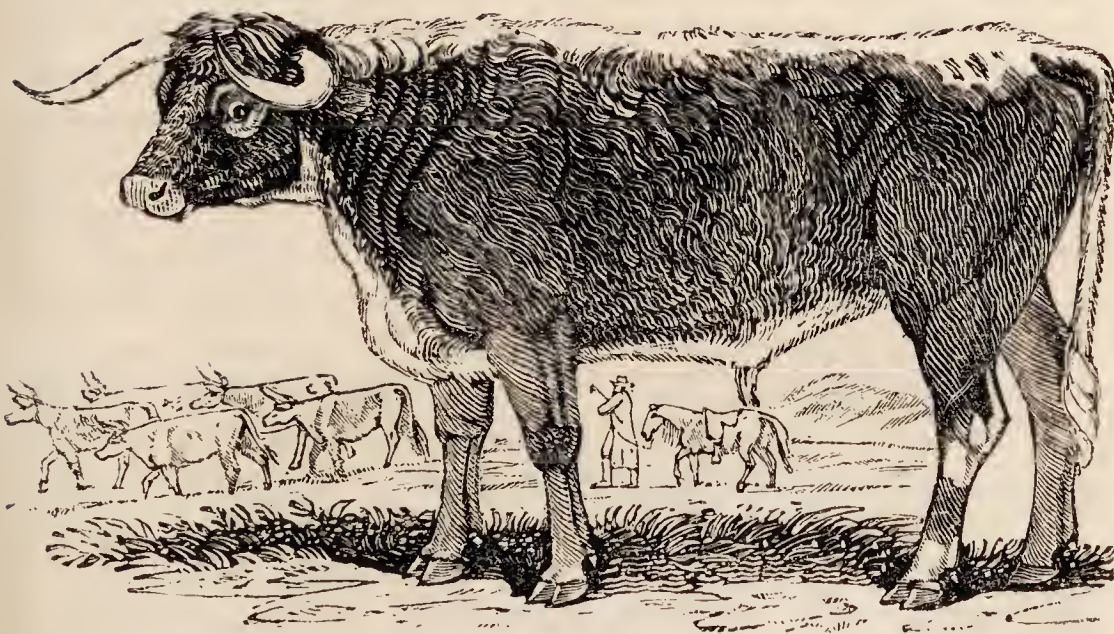
THIS profitable breed is raised in Kent: the Sussex forms the basis, crossed, however, with Welch, Alderney, and other races: though small in size, they are excellent butter cows.

LANCASHIRE BREED.

THIS is an original species, of high antiquity, yet still found in considerable, if not entire, purity of form; because, though used as a cross for most other breeds, the great improvers of long-horned cattle have generally, for various reasons, adhered to their own species. They were called, formerly, Lancashire long horns, that county, Westmoreland, and Cumberland, being the earliest and most considerable breeding districts; thence they spread southward, through the midland breeding, or dairy counties of Derby, Nottingham, Leicester, Stafford, Warwick, Northampton, and Buckingham. The neck of land containing Lancashire and Cumberland, west, Yorkshire, Durham, and Northumberland, east, has, by a curious singularity, been the parent country of both long and short-horned cattle; the latter, extending from Northumberland southward, to the



Cheviot Sheep.



Long-horned Ox.

county of Lincoln. Now it having been, for ages past, the practice to import short-horned cattle from the opposite continent to our eastern coast, it seems rational to suppose that the long-horned, found on the western side, were originally imported from the opposite coast of Ireland; the neat cattle of that country being all long-horned.

The characteristics of the Lancashire breed, are, rotundity of carcase and bone, with considerable length of the former, and coarseness of the latter; thickness of hide, and richness of milk, in less quantity than that of the short and middle horns. The horns are either regular and horizontal to the points, or fall down until their points meet, when the animal is sometimes styled *wheel-horned*. Occasionally, the long horns fancifully grow upwards, bending irregularly at the extremities; sometimes one horn grows up, the other downwards. The original colours were red, pied, brinded, and finch-backed, or with a list of white along the back, the strongest characteristic of long-horned blood; (as the bald face is that of Hereford, and the smoky face of Pembroke.)

The species, with few exceptions, is too slow and sluggish for labour; which circumstance has induced many persons to form erroneous conclusions on the subject of ox-labour. But other advantages which this breed evidently possesses, concur to render it worthy the extensive introduction it has obtained. The peculiar rotundity of form, and richness of milk, augur a propensity to fatten; and they probably are the smallest consumers of food in proportion; and their hides, because of their substance, are much valued.

An additional recommendation is their hardy constitution, which adapts them to every variation of climate in our island. The value of a cow and a calf, of the better sort of the common stock, in 1822, was from seven to twelve pounds: when fatted, the cows are worth from six to sixteen pounds each, and generally weigh from eight to twelve score per quarter.

As dairy stock, their superior character has been very long established; in consequence they are dispersed in every part of the island. Within these few years, however, the short-horned species have been admitted into

many large dairies, because of the excessive price of beef and pork, and on the supposition that larger milkers and larger cows, if they make less butter, will balance the account profitably, by producing a greater quantity of the former articles.

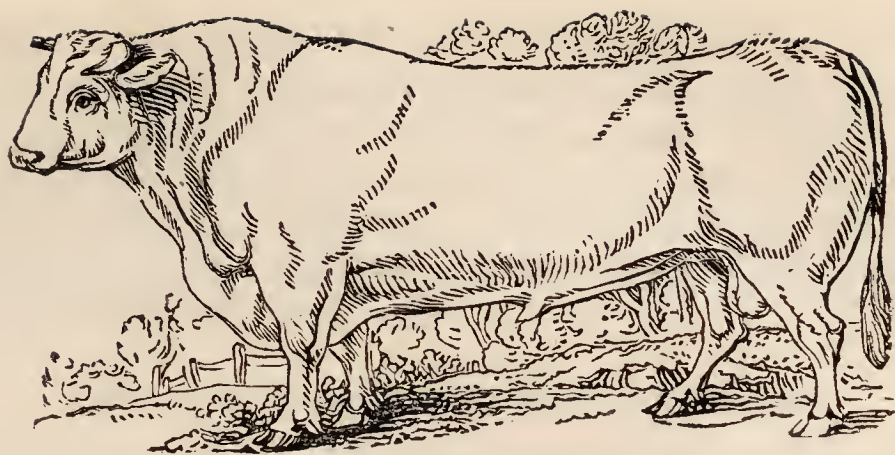
THE SHROPSHIRE BREED.

THIS race is large, square, deep, and bony, with thick hides, in colour brindled, red, and brown, the horns branching, points turned upward and backward. They are used for labour, and are better milkers than the Hereford, with which they are often blended. Of the origin of this variety no accounts are extant, or how long they have been a permanent, or established breed. They probably originate in a mixture of the old long horns, the Welch and the West red breed.

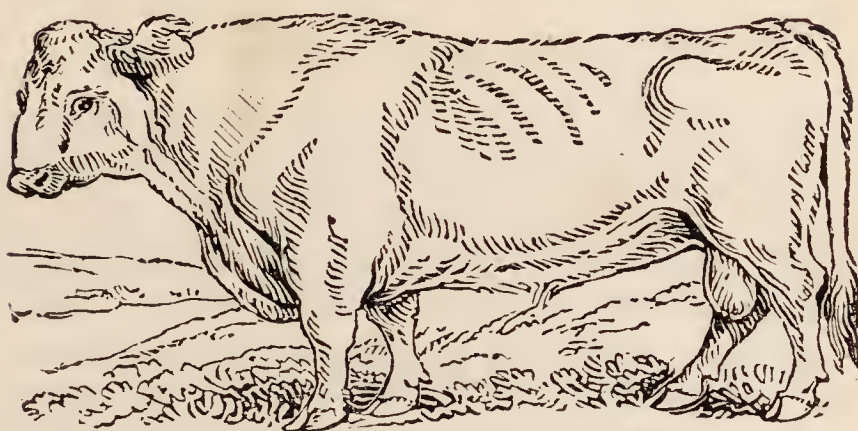
NORTHERN SHORT-HORNED BREED,

Comprises the Tesswater, Lincoln, and Holderness, or Yorkshire and Tweedside short-horned breeds. The northern short-horned race is the largest breed in Britain; the Herefords standing second. The short-horns are an original species, but it cannot now be ascertained whether they are aboriginal, or were imported in very early times, (as they have continually been during several centuries). This breed has long been in possession of the coast and districts of Northumberland, Durham, York, and Lincoln, meeting and intermixing with the Lancashire long-horns westward, but not extending so far south. Opposite almost every way to the long-horns, this species has great depth of carcase; with ample substance, large bone, thin hide, and gives much milk, not distinguished for its richness. They are not of first-rate character for labour, which the Holderness variety seems to promise by their form.

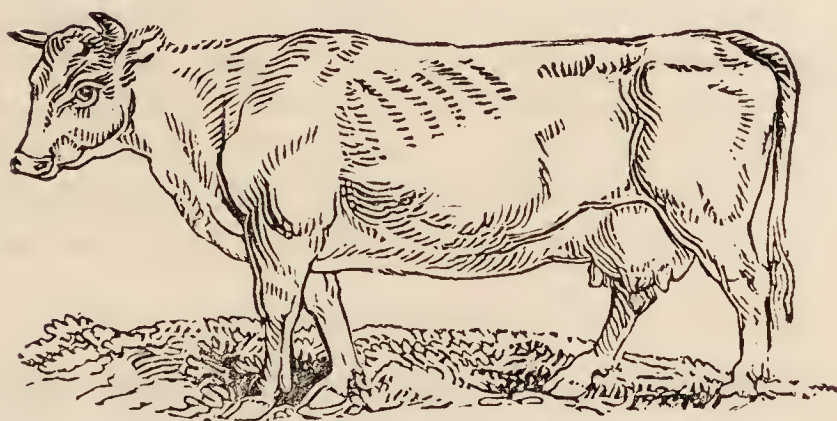
The coarse, square, Dutch beefy breed is the basis of this species, which has been improved in the last century, by introducing Norman or Alderney bulls, productive of the most beneficial results. For quantity of milk, this improved breed is unrivalled; their beef is much finer than that of the old short-horned breed, and they fatten much sooner. They have both speed and strength for labour, and their shoulders are well formed and set for



Short-horned Bull.



Galloway Bull.



Ayrshire Cow.

draught; and being beautifully variegated in colour, spotted, striped, or sheeted red and white, black, brown, or white, they make fine stock for a park. This breed equals the Herefords in the stall, at all points, and only inferior in fineness of flesh. The Holderness cows form the stock kept by the London cow-keepers for supplying the metropolis with milk.

THE NORTHERN HALF-LONG HORNS,

BEING the produce of the junction of the northern and short-horned breeds, possess equal portions of the qualities of the parent breeds; and consequently afford plenty of good milk.

THE NORFOLK HOMEBREDS.

THIS appellation is given to the cattle raised in Norfolk, before the breeding of cattle ceased to be pursued as a system. The Norfolk homebreds consist of a medley of Suffolk, Lincoln, Scots, and Welch races: they graze earlier and more quickly than either the Scotch or Welch cattle, so much used in Norfolk; and no cattle make better proof, or bear higher character with the Smithfield salesmen, than the Norfolk homebreds.

WELCH CATTLE.

THE Welch cattle are small in size, and mostly of a black colour; the horns large, bending upwards; their hides are thick; and, in proportion to their bulk, they have much bone. They are remarkably quick feeders, and well calculated for labour; especially those bred in Glamorganshire: they are capable of great improvement by proper selection and judicious crossing.

SCOTCH CATTLE.

THE cattle bred in North Britain are divided into (1) the Galloway or Polled, found chiefly in the county of Galloway; (2) the Highland breed or Kyloes, reared in the highlands and western parts of Scotland: and (3) the Lowland breed, a mixed race, bred in the lowlands of Scotland.

(1.) GALLOWAY OR POLLED.

THESE cattle are a very valuable breed; and, in weight and size, seem as much less than the long-horns, as these are less than the short-horns; they generally weigh from forty to sixty stone, some reach seventy and upwards. But their most essential difference from every breed, is, in being without horns; though some few (in every other respect polls,) have two little horns, from two to four inches long, hanging loose from the parts where the horns of other cattle grow, and joined to the head by a little loose skin and flesh. In other respects (except wanting horns) these cattle resemble the long-horns, in colour and shape, only shorter in form, which probably makes them weigh less. Their hides seem in a medium not so thick as the long-horns, nor so thin as the short-horns; but, like the best feeding kind of long-horns, they lay their fat upon the most valuable parts, and their beef is well marbled, or mixed with fat. Vast numbers of these cattle are annually sent into Norfolk, and other English counties, to be fattened for the markets.

Variety. THE SUFFOLK DUNS.

THIS very profitable variety originated in the polled galloway breed of Scotland, with which Suffolk and Norfolk have been supplied more than a century. They are of lighter colours, smaller, and finer in bone than the Scots galloways; long, with a large carcase, clean throat, the neck tapering to the head, thin tail, and rather short legs. These are excellent dairy stock, giving the largest quantity of milk, in proportion to their size, of any breed; but not so rich as the long horns or Alderneys. A first-rate Suffolk cow will give six gallons of milk per day, when in full milking, and at the best season. This breed also feeds well, and the beef is fine: it is a breed of such inherent excellence, as not to be improvable by any known cross. The Suffolk cow is one of the most advantageous for a private family.

(2) HIGHLAND BREED, OR KYLOES.

THIS breed of cattle, like the polled and long-horned, is covered with a long close coat of hair; the beef is

fine-grained, well-flavoured, and marbled, but not so handsome on the outside when killed ; not of a bright colour, and often spotted with black, even upon the best parts, except when very fat. When grazed they feed readily ; their weight is from 20 to 35st. ; some particular ones reaching 40st. The most prevalent colour is black, some are brindled, or dun ; but the breeders prefer the black ones.

These hardy animals possess all that extensive and mountainous country called the Highlands of Scotland, with the Western Isles, bounded on all sides by the sea, and the Grampian-hills. Every autumn they are driven southward in great numbers ; many into the west parts of Yorkshire ; but most are sent into Norfolk, Suffolk, Essex, and the south of England, where they are fattened, and either slaughtered at home, or sent to Smithfield. The demand for kyloes in England is of vast importance to those nobility and gentry who have estates in the north of Scotland ; as the most of their rents are paid in live cattle.

In their natural and unimproved state the Highland cattle are well-formed : their fine eyes, acute face, and lively countenance, give an air of fierceness, heightened by their white, tapering, black-tipped and sharp horns, pointing upwards, forwards, or backwards, and really dangerous. The best Highland cattle are bred in Lochaber, Sunart, Morvin, and Cowall or Rannock. The Orkneys produce a small and ill-shaped breed of cattle ; which, however, yield much milk, and afford excellent beef. The Fifeshire cattle attain a tolerable size ; their horns are turned up, they are black, lively, feed quickly, and are fit for labour ; their milk, though not very abundant, is rich, and uniform in its supply. The Isle of Sky breed is found chiefly where its name originates ; of a diminutive size, but much similar to the kyloes ; only superior for quick fattening.

(3) LOWLAND BREED.

THIS is a mixed race between the kyloes and the gallows, partly long-horned, and partly polled. They are black, brindled, or dun-colour ; indifferent for the purposes of the dairy, though, as they partake of the gallows kindliness to fatten, large numbers are annu-

ally sent from the lowlands of Scotland into England, to be fattened for the markets.

ALDERNEY, OR FRENCH BREED.

THIS breed is chiefly found at the seats of the nobility and gentry, who keep the cows for the rich and excellent milk they furnish for the tea-table. This gives them a claim to notice, though the breed is too tender to be introduced into the northern parts. They are small-sized, very fine boned, of a light red or yellow colour; and their beef, mostly yellow or highly coloured, is very fine in the grain, and well-flavoured.

Variety. THE DUNLOP BREED.

Is a cross of Alderney cows with Fifeshire bulls, and is named from the place where first reared. The breed is small, and of a pied, or sandy-red colour; their horns are small, and awkwardly set; but the cows are well calculated for the dairy, because of the plentiful supply of rich milk they afford. Dunlop cheese is the most excellent produced in Scotland.

THE DUTCH BREED.

THESE animals are of Dutch extraction; originally brought from Holland into the eastern counties, to which they are chiefly confined. They are short-horned, thin-skinned, and have little hair, of a red and white colour, nearly equally mixed; but their constitutions being tender they require great care; they yet possess the valuable property of fattening kindly, and yielding abundance of milk and tallow.

IRISH CATTLE.

THE breed of Irish cattle is distinguished by little variety, except what necessarily arises from difference of situation. Originally they are long-horned cattle, smaller than the English, somewhat coarser, and higher on the leg: their produce in hides and tallow is considerable. The Irish mountain cattle are less in size, and inferior in grain of flesh, to those of the low country; and they yield very little milk; they are, however, remarkable for strength of constitution. The counties of Roscommon, Limerick, Cork, and Tipperary, are celebrated for the vast herds of cattle annually bred and



The Beaver.



Beaver Colony.

slaughtered for exportation; and many of the most public-spirited breeders have, of late years, incurred considerable expense by purchasing prime long-horned stock from England, to improve their breeds; a measure already attended with most beneficial effects; and which, in a few years, will prove a source of great wealth to that island.

The ox-tribe do not cast any teeth until they are turned two years, when they get two new teeth; at three years old, two others; and two every succeeding year, until five years old; then they are said to be full-mouthed; though, in fact, the two corner-teeth are not perfectly up until they are six. After these signs become uncertain, the horns may be resorted to; at three years old, they are smooth and handsome; after which a circle or wrinkle is annually increased while the horn remains; so that, from the number of rings, the age of a beast may be ascertained; unless the wrinkles are defaced, or artificially removed, by filing or scraping,—a fraudulent practice, too frequently adopted, to deceive the ignorant or inexperienced purchaser with respect to the real age of the animal.

THE BEAVER.

THE beaver is distinguished from every other quadruped by its tail; which is oval, nearly flat, but with a slight convexity upward, devoid of hair, and marked by scaly divisions. His tail he uses as a rudder to direct his course in the water; its general length is nearly one foot; and that of the body about three feet. The colour of the beaver is a deep chesnut, and its hair is very fine, smooth, and glossy; though, like other quadrupeds, it sometimes varies in colour; and is, occasionally, completely black; also white, cream-coloured, and spotted.

The beaver (*castor fiber*) is a native of the northern parts of Europe, Asia, and North America; abounding most in cold regions, and gradually less common towards the south. In ancient times the beaver was an inhabitant of France, Spain, Italy, Greece, and Egypt, though now scarcely ever observed there. They have long been wholly exterminated from Britain, but they once abounded here. The latest account we have of them is in 1188; when they were found only in the Teivi river.

Several pools of water in the northern parts of Wales bear now the name of *Llyn yr afange*, the pool or lake of beavers; as two, if not more, of the pools amid the wilds of Snowdon; a remarkable one exists in the romantic vale of Nant Frangon, near Beddgelert, in Caernarvonshire; and another near the Conway, above Llanrwst; all which were evidently the haunts of beavers.

Of all quadrupeds, the beaver possesses most natural or instinctive sagacity, in constructing its habitation; preparing, in concert with others of its own species, arched caverns or domes, supported by strong pillars, plastered internally with neatness and accuracy, excelling the art of any other quadruped. The beaver's extraordinary sagacity was not known to the ancients, though they killed the animal for the medical drug, *castor*.

In places much frequented by man, beavers neither associate, nor build habitations; but, in the northern regions, in June or July, they assemble from all quarters, and soon form a troop of two or three hundred, for the purposes of society, and of building a city. The place of rendezvous is generally the situation fixed upon for their establishment, and is always on the banks of waters. If the waters seldom rise above their ordinary level, as in lakes, the beavers make no bank or dam. But in rivers, or brooks, where the water is subject to risings and fallings, they build a bank across the river like a sluice, often from eighty to one hundred feet long, by ten or twelve broad at the base; which, for animals so small, appears enormous, and pre-supposes incredible labour. But its solidity is more astonishing than its magnitude. The part of the river where they erect this bank, is generally shallow. If a large tree on the margin can be made to fall into the river, they begin by cutting it down, for the basis of their work; (this tree is often thicker than a man's body,) by some of them gnawing the bottom with their four cutting-teeth, they accomplish their purpose, and always make the tree fall across the river. They next cut off the branches, to make the trunk lie level. Others at the same time cut down trees of smaller size, which they next cut to a certain length, dress into stakes, and drag

by land to the margin of the river, and then by water to the place where the building is carrying on. These larger piles they sink down, and interweave the branches with the stakes. In this operation many difficulties are to be surmounted. To dress these stakes, and put them in a situation nearly perpendicular, some of the beavers must elevate, with their teeth, the thick ends against the margin of the river, or against the cross tree, while others plunge to the bottom, and dig holes with their fore-feet to receive the points, that they may stand on end. When some are thus labouring, others bring earth in their mouths, and with their fore-feet, which they plash with their feet, and beat firm with their tails. They transport earth in quantities to fill all the intervals between the piles. These piles consist of several rows of stakes, of equal height, placed opposite each other, and extending from one bank to the other. The stakes facing the lower part of the river are perpendicular; but those opposed to the stream slope upward to sustain the pressure; so that the bank, which is ten or twelve feet thick at the base, is reduced to two or three at the top. Near this, the beavers make two or three sloping holes, to allow the surface-water to escape; which they enlarge or contract as the river rises or falls; and, when any breaches are made in the bank by sudden or violent inundations, they repair them when the water subsides.

Hitherto these operations are performed by the united force and dexterity of the whole community. They now separate into smaller societies, who construct upon piles, near the margin of the river or pond, cabins or houses, with two openings, one towards the land, and the other into the water. These cabins are of three or four stories, either round or oval, and vary in size from four to ten feet in diameter. The walls are about two feet thick, raised perpendicularly upon planks, or plain stakes, which serve both for foundations and floors; when they are but one story, they rise perpendicularly a few feet, then assume a curved form, and terminate in a dome, which answers as a roof. They are built with amazing solidity, and both within and without neatly plastered with a kind of stucco: in applying this mortar their tails serve for trowels, and their feet for plashing. These

cabins are impenetrable to rain, and resist the most impetuous winds.

In their construction are employed different materials, wood, stone, and a sandy earth, not liable to dissolve in water. The wood is generally alders, poplars, and willows, which grow on the banks of rivers, and are more easily barked, cut, and transported, than heavier and more solid timber. They always begin cutting trees at a foot or a foot and a half above the ground: they labour in a sitting posture; and, beside the convenience of this posture, they enjoy the pleasure of gnawing perpetually the bark and wood, which are their favourite food. Of these provisions they lay up ample stores for support during the winter. Each cabin has its own magazine proportioned to its inhabitants, who have all a common right to the store, and never pillage their neighbours. Some villages have twenty or twenty-five cabins; but these are not frequent; the common republics seldom exceeding ten or twelve, of which, each have their own quarter, magazine, and separate habitation. The smallest cabins contain two, four, or six, and the largest eighteen, twenty, and sometimes thirty beavers; often equally paired as to males and females.

In their society, however numerous, universal peace is maintained. Their union is cemented by common labours; and perpetuated by mutual conveniency, and the abundance of provisions amassed and consumed together. A simple taste, moderate appetites, and an aversion from blood and carnage, divest them of the ideas of rapine and war. Friends to each other, they know how to avoid any foreign enemies they may have. When danger approaches, they advertise each other, by striking their tail on the water; the noise is heard at a great distance, and resounds through all the vaults of their habitations. On these occasions each individual consults his own safety; some plunge into the water; others conceal themselves within their walls, which can be penetrated only by fire, or the steel of man; and which no animal will attempt to either open or overturn. These retreats are safe, neat, and commodious; the floors are spread over with verdure: branches of box and fir serve for carpets, upon which they permit

not the smallest dirtiness. The aperture facing the water answers for a balcony to receive the fresh air, and for the purpose of bathing.*

During most of the day, the beavers sit on end, with their head and anterior parts elevated, and their posteriors sunk in the water. The aperture is sufficiently raised to prevent its being stopped up with the ice, which, in the beaver climates, is often two or three feet thick. When this accident happens, they slope the sill of the window, cut obliquely the stakes which support it, thus open a communication with the unfrozen water, and often swim a long way under the ice. The continual habit of keeping their tail and posteriors in the water appears to have changed the nature of their flesh; as that of their anterior parts to the reins, has the taste and consistence of the flesh of land-animals; but that of the tail and posteriors has the odour and other qualities of fish.

In September, the beavers collect their provisions of bark and wood. Till the end of winter, they remain in their cabins, partake the fruits of their labours, and enjoy the sweets of domestic happiness. This is their time of repose, and their season of love. Knowing and loving one another, each couple unite, not by chance, but by taste and real selection. The females bring forth two or three at a time in the end of winter.

THE MOLE.

THE whole form of the mole (*talpa europæus*) is well calculated for its subterraneous mode of life. Its fore feet are quite naked, very broad, having large palms almost like a hand, with five toes on each, terminated with strong nails, very concave upwards; and in place of a thumb, a strong bone under the skin. The hind feet are very small, with five slender toes, and a small thumb on the inside. Its skin is proportionally much thicker and tougher than other quadrupeds; and the fur equally surpasses in fineness and softness. This animal is supposed to possess an exquisite power of hearing; and, when at any time it emerges from its sub-

* Smellie's Philos. of Nat. Hist. vol. i. p. 313.

terraneous retreat, it instantly disappears on the approach of danger. When first taken, either by digging out, or otherwise, it utters a shrill scream, and prepares for defence, by exerting the strength of its claws and teeth.

The eyes of the mole are scarcely perceptible, being so small, and deeply imbedded in fur; but whether intended by nature for distinct vision, or merely to give the creature such notice of the approach of light, as might sufficiently warn it of the danger of exposure, is matter of doubt. The mole feeds on worms, insects, the roots of vegetables, &c. but, generally, it is carnivorous, and, in particular circumstances, extremely fierce and voracious.

The habitation where moles deposit their young is constructed with peculiar intelligence; they raise the earth, and form a pretty high arch; they leave partitions at certain distances, beat and press the earth, interweave it with the roots of plants, and render it so hard and solid, that the water cannot penetrate the vault, on account of its convexity and firmness; they then, under the principal arch, elevate a little hillock, upon which they lay herbs and leaves for a bed to their young, above the level of the ground, and, of course, beyond the reach of ordinary inundations; they are, at the same time, defended from the rains by the large vault that covers the internal one, upon which they also rest. This internal hillock is pierced with sloping holes, which descend and serve as subterraneous passages for the mother to go in quest of food; these bye-paths are beaten and firm, extend about twelve or fifteen paces, and issue from the mansion like rays from a centre. Under the superior vault are remains of the roots of meadow saffron, the first food given to the young. Hence the mole never comes abroad but at considerable distances from her habitation. Moles, like beavers, pair; and from their lively and reciprocal attachment they seem to disrelish all other society. In their dark abodes they enjoy the placid habits of repose and solitude, the art of securing themselves from injury, of quickly making an habitation, and of procuring a plentiful subsistence without the necessity of going abroad. They shut up



The Mole.



The Mole Catcher.

the entrance, and seldom leave their retreats, unless compelled by the flux of water, or when their mansions are demolished.

The mole's muscular strength is very great, and it can force itself into the ground with extraordinary celerity. On one occasion, a mole is said to have been seen swimming towards a small island, in the middle of the loch of Clune, in Scotland, at a distance of one hundred and eighty yards from land.

In rich and fertile soils, mole-hills are frequently thrown up, as they abound with the food of these subterraneous animals. Meadows are often much injured by them, because of the depth of soft, humid soil. Moles destroy and render useless the grass of the spot where the hills are raised, and some extent around; and, as they also impede the free course of the scythe, their extermination becomes an object of consequence to grass husbandry. The practice pursued by some, is to spread out the mole-hills in the spring; but the best method invariably is, never to suffer the animals to remain in the land, but to catch and destroy them, and thus prevent the hills from being thrown up.

THE SHEEP.

First with assiduous care from winter keep,
Well foddered in the stalls, thy tender sheep :
Then spread with straw the bedding of thy fold,
With fern beneath, to fend the bitter cold.

VIRGIL.

OF domestic animals, none is so extensively beneficial to man as the sheep kind. Others may excel in strength, docility, and dignity; but the sheep supplies both food and clothing, and is indispensable to our comforts, almost to our existence. In an agricultural view, sheep are of vast importance, as there are few farms on which they may not be advantageously kept, either for breeding, grazing, or for feeding fat lambs. Pope remarks

The fur that warms the monarch, warmed a bear :—

but the wool of the sheep warms every class of people, from the monarch to the beggar; it employs thousands in its manufacture, and whole fleets in its exportation.

Every individual is interested in this great staple commodity, from the lord who sits upon the woolsack, to the industrious peasants who card and spin.

This animal is generally known; its most prominent characters are eight cutting teeth in the lower, and nine in the upper jaw; the horns twist spirally outwards; the tail round and short, and the body covered with wool.

The domestic sheep, in its most valuable, woolly state, exists in perfection only in Europe, and the temperate parts of Asia. In very warm climates, it loses its wool, and is coated with hair, with only a short wool next the skin; and, in very cold climates, the exterior wool is hard and coarse, though the interior is more soft and fine. In England, and some other European regions, the wool acquires peculiar length and fineness, and is best adapted to the purposes of commerce; that of Spain is finer, but less proper for using alone; and hence is mixed with the English for the superior cloths.

Of all quadrupeds, domestic sheep are the most innocent and defenceless. Accustomed to depend on man for support, they resign themselves to his will, and seem to have few instincts, except those necessary to preserve and continue the race. They tremble at the voice of the shepherd or his dog; and (in distinction to the horse and cow,) are more awed by the latter than the former. Hence some natural historians represent the sheep as the most stupid of all quadrupeds; but this is not altogether just; for though his talents be less brilliant than those of some other quadrupeds, he is not the stupid, defenceless, timid creature they have delineated.

All tame animals lose a portion of that sagacity, dexterity, and courage, which when wild they have to employ against their enemies; because they have been long accustomed to rely upon the protection of man; but, on those extensive mountains, where they range with little control, and seldom depend on the shepherd's aid, they behave very differently. In this situation, a ram or a wedder boldly attacks a single dog, and is often victorious. And when the danger is more alarming, like man, they trust not to the prowess of individuals,

but resort to the collected strength of the whole flock; they draw up into a compact body; place the young and the females in the centre; and the strongest males take the foremost ranks, keeping close by each other's sides. Thus an armed front is presented, which cannot be attacked without great hazard of destruction. Thus they wait, with firmness and intrepidity, the approach of the enemy. Nor does their courage fail in the moment of attack: for, when the aggressor advances within a few yards of the line, the rams dart upon him with an impetuosity which lays him dead at their feet, unless he saves himself by flight. Against the attacks of single dogs, or foxes, they are perfectly secure, when in this situation. Besides, a ram, regardless of danger, often engages a bull, and seldom fails to conquer him; for the bull, lowering his head, insensible of his defenceless condition, receives between his horns the stroke of the ram, which usually brings him to the ground.

The boldness of the female, (when not in absolute slavery) in protecting her young from injury, is extremely remarkable. When robbed of her lamb, her bleats strongly mark the anguish she feels; in her eager search, the eye-balls almost start from their sockets; and her irregular and distracted motions, joined to her violent and constant bleatings, indicate the most pungent grief. The sportive gambols of tame sheep are too well known to need description.

A lamb, separated from the flock, and brought up by the hand, often displays considerable docility and attachment. Admitted to a degree of intimacy with mankind, it will sometimes play several frolics, and butt against its benefactors; but the general inoffensiveness of its manners, recommends it so strongly to human regard, that it is usually a particular favourite with infancy and youth.

In selecting food, few animals discover more sagacity than the sheep; nor does any domestic animal shew more dexterity and cunning in its attempts to elude the shepherd's vigilance, and to steal delicacies agreeable to its palate. Besides their hardiness in enduring great severities of weather, their natural instinct, in foresee-

ing the approach of a storm, is remarkable: in endeavouring to secure themselves under the shelter of some hill, whole flocks have been buried many days under a covering of snow, whence they have afterwards been taken out without sustaining material injury. An instance is mentioned of a sheep, which, at the approach of a storm, fled for shelter to a neighbouring cottage, and took refuge with its shepherd.

These animals are supposed to be fond of any jingling noise; and, therefore, shepherds often fasten a bell round the neck of the leader (thence called the *bell-wether*), the sound of which prevents the flock from ranging far from the spot where he feeds; they implicitly follow their leader wherever he goes; but in any sudden alarm, if one of the flock push forward to escape, and thus take the lead, the rest mostly follow him, and precisely in the same way. A ludicrous instance of this disposition of sheep, occurred at Liverpool:—A butcher's boy, driving twenty fat wedders, they ran down a street where he did not want them to go. He called loudly to a scavenger at work with his broom. a little way before, to stop the sheep; the man accordingly did his utmost to turn them back, running from side to side, always opposing himself to their passage, and dexterously brandishing his broom; but the sheep, much agitated, pressed forward; and at last, one of them came right up to the man, who, fearing it was about to jump over his head, while he was stooping, raised his body erect, and, grasping the short broomstick in both hands, held it over his head; but only a few seconds; for the sheep made a spring, and jumped fairly over him, without touching the broom. No sooner had the first cleared this impediment, than another followed, and another, and another, in such quick succession, that the man, altogether confounded, seemed to lose all recollection, and retained the same attitude, till the whole had jumped over him, not one of them attempting to pass on either side, though quite clear. This taking place during wet weather, the poor fellow was bespattered all over with dirt before all had passed; and it is impossible to conceive a more ludicrous appearance than he made on the occasion.

The natural division of these useful animals being obviously that of hornless and horned, it is adopted in the following notice of the British breeds :

SHEEP WITHOUT HORNS.

THE LINCOLNSHIRE BREED,

Is found principally in the county of Lincoln, whence its name, and is distinguished by white faces, large bones, long, thin, and weak carcasses, with thick, white, and rough legs. Its fleece, the heaviest of all British breeds, weighs from nine to eleven pounds when the animal is killed at three years old ; the wool is fine, and from ten to eighteen inches long. The original Lincoln race was calculated only for rich pastures, being slow feeders, and distinguished by the defects of a loose form, coarse-grained flesh, and too much bone. These disadvantages are now removed, by crossing with Dishley or new Leicester rams ; the name, however, of a good old Lincoln sheep is yet held in request at Smithfield ; and the flavour of Lincoln mutton is considered superior to that of the Dishley breed.

THE TEESWATER BREED,

DIFFERS from the Lincolnshire, in their wool being not so long and heavy, standing upon higher, though finer-boned legs, yet supporting a thicker, firmer, heavier, carcase, much wider upon their backs and sides, and affording a fatter and finer-grained carcase of mutton. The two-years-old wethers weigh from twenty-five to thirty-five pounds per quarter ; some particular ones, at four years old, have been fed to fifty-five pounds.

The Teeswater sheep were originally from the same stock as the Lincolnshire ; but by constant attention to size, rather than wool, they have become a different variety of the same original breed.

This large kind of sheep is not adapted to live in numerous flocks, or upon bare pastures ; depasturing few together, they require good ground, and great indulgence in winter. Accordingly, in that fine tract of country, by the Tees, where these sheep are most kept, the land is good, well sheltered, and in small inclosures ; a few in the same field. Some breeders allow them to go

to a hay-stack all the winter, or to hecks or sheep-racks in the field, and generally give the ewes corn, for some time previous to and after their lambing.

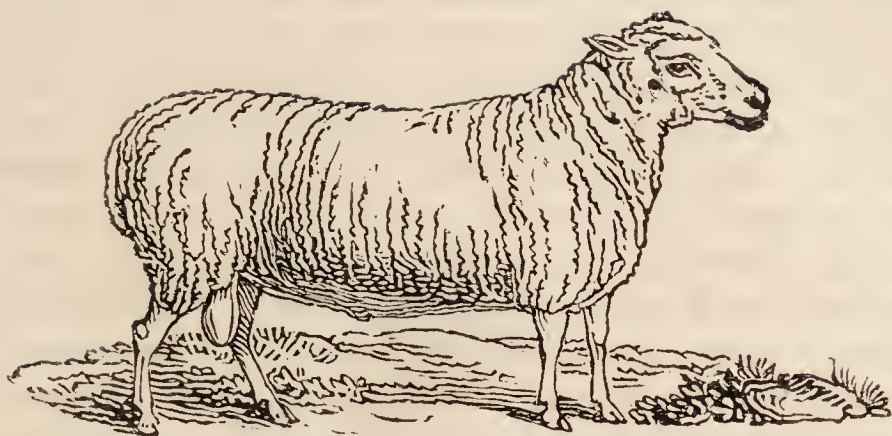
The ewes of this breed generally bring two lambs, and sometimes three: there are instances of even four or five. A Mr. Eddison had a ewe that produced him sixteen lambs in four years, of which the first nine lambs were yeaned within the short space of eleven months. This breed is now rarely found pure, except with old breeders.

THE DISHLEY, OR NEW LEICESTER BREED.

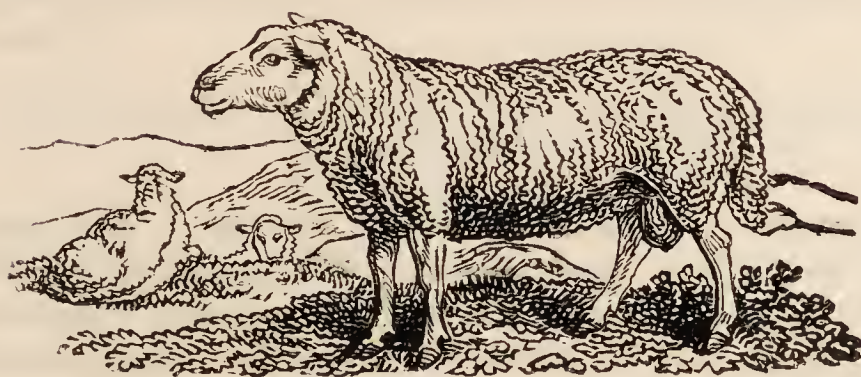
THESE sheep are distinguished from other long-woolled breeds, by their clean heads, fine lively eyes, straight and broad backs, round or barrel-shaped bodies, fine and small bones, and thin pelts. Their peculiar advantages are, fineness and length of wool, well adapted for combing, and averaging eight pounds per fleece, when killed at two years old, the most profitable time for slaughter. The new Leicesters are hardy and vigorous; and as with less food they fatten kindly and early, they are admirably calculated for the market, especially as they thrive on pastures that will scarcely keep other sheep.

From the appearance of the stock, the fineness of the wool, and grain of the mutton, it is probable that a Ryeland cross was a prime instrument in the Dishley improvement of sheep. Probably the foundation was Lincoln. The Dishley cross has made its way to the Land's End, the bottoms of the Welsh mountains, and of the Scottish Highlands, to Ireland, and even to Russia. On stock naturally good and improveable, from the New Leicester cross, the improved have considerably surpassed, in the most valuable properties, their improvers; as many examples may be seen in the improved Lincoln, Northumberland, and midland county sheep.

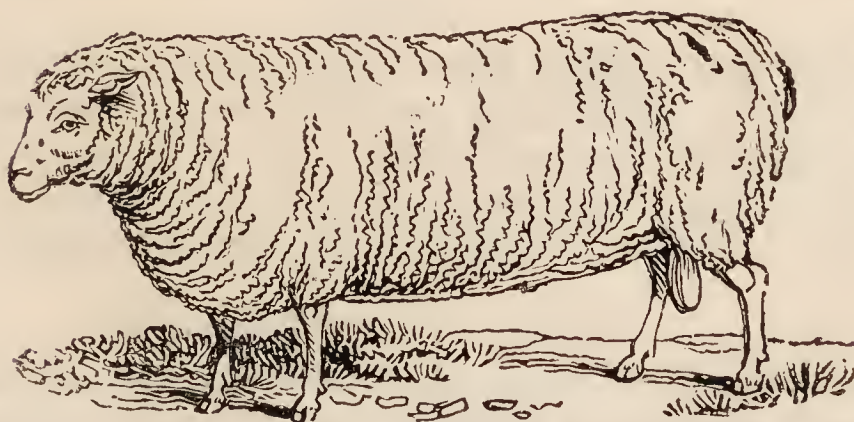
Very high prices have been given for new Leicester tups and ewes, and at vast rates have the former been let for the season. Bakewell's famous ram, named the two pounder, was let for one season, at the substantially famous price of eight hundred guineas, exclusive of his duty, in the same season, to the flock of his proprietor,



South Down Breed.



Cheviot Breed.



Leicester Breed.

which being reckoned proportionally, amounts to the almost incredible sum, for one year, of twelve hundred guineas. Such high prices, however, are given only by tup breeders; it is averred that now not less than ten thousand farmers, in the midland counties, either let or hire, each a tup, for the season, at ten pounds. The hired tups are conveyed, some time in September and October, in two-wheeled carriages, hung on springs, and large enough to hold three or four rams. In these they very conveniently travel twenty or thirty miles a day, and have sometimes been sent upwards of three hundred miles. The tugging business has been productive of much profitable intercourse; every considerable breeder, during the shews, keeping open house to the profession. The practice of improvement has also introduced the most liberal and judicious system of sheep management. The annual private shows of rams, in the neighbourhood of Leicester, with the public exhibition of them at that town, in October, are calculated to afford considerable amusement and information to an amateur.

THE COTSWOLD OR IMPROVED GLOUCESTERSHIRE BREED,

Is originally a variety of the Lincolnshire sheep, improved by crossing, but now become a distinct race. These sheep are found chiefly on the Cotswold hills, in Gloucestershire. They are considered in many respects superior to the parent stock: the wool is fine and well adapted for combing; and the mutton is full sized, and of a fine grain.

THE DARTMOOR, BAMPTON, OR DEVONSHIRE NATTS,

HAVE white faces and legs, thick necks, large bones, narrow backs, high back-bone, good sides, and short legs. The wool is long, averaging nine pounds per fleece, at about two years and a half old: the breed is chiefly confined to the moor whence its name.

THE SOUTH-DOWN BREED,

Is one of the old varieties of sheep in this island, and has from time immemorial possessed the Sussex downs,

and the Kentish hills. Of late years their great merits both as hill and pasture sheep, becoming more generally known, they have been introduced into most parts of Britain and Ireland. Their faces and legs are grey, bones fine, neck long and small, low before, shoulder high, light in the fore-quarter, sides broad, loin tolerably good, back-bone rather high, thigh full, and twist good. The wool is very fine and short, from two to three inches long, averaging two pounds and a half per fleece, when killed at two years old. The flesh is fine grained, and of excellent flavour. They are quick feeders, consume less food in proportion to their weight than the Norfolks, yet keep in better order, of a hardy and vigorous constitution, capable of improvement. As young sheep produce the best lambs, the crones are constantly sold at four or five years old; and were this done earlier, it would be more profitable. More than one third produce twins, if the ewes be well fed, and the lambs be well covered when yeaned. They are quiet, healthy, and handsome park stock—no small recommendation in this age of fashionable breeding.

THE ROMNEY MARSH BREED.

THIS is a large long-woolled breed, averaging eight pounds per fleece, when killed at two years and a half old. They have white faces and legs, rather large bones, and round or barrel-shaped bodies. The flesh is excellent and fine-grained, and the sheep fatten kindly on rich marsh or pasture-grounds, where only they are profitable. The stock is good, and with proper attention capable of much improvement without an alien cross.

Romney Marsh has ever been famous for its vast annual return of mutton and wool, and the number of sheep per acre it constantly feeds. It is divided into breeding and feeding grounds, according to quality. The graziers provide a sufficient number of Welsh calves, and keep them at a straw-yard, in readiness to turn into the marshes in season, to keep under the long grass, and prevent its running away from the sheep. The marsh is supposed to produce twenty pounds of wool per acre, or an annual total of five thousand packs, some of the finest quality, and longest staple; but often disadvantageously mixed with inferior; which induces

a hesitation in the buyer, and an uncertainty as to the price. The winter management of the sheep needs improvement more than the breed. The ewes are much injured by exposure, and in a difficult season are very weak at yeaning time, seldom bringing up more than a lamb, although many twins are yeaned; great sickness and mortality often ensue, causing an immense waste of mutton and wool, with no trifling reduction of condition and quality in the stock. (See Lawrence on Cattle, p. 334.)

THE HEREFORD OR RYELAND BREED.

THESE sheep have white legs and faces, with wool growing close to their eyes, and a tolerably well-formed carcase, producing excellent mutton. The wool is fine and short, weighing from one pound and a half to two pounds and a half per fleece. Those sheep which have the finest wool are kept lean, and yield a pound and a half each; if better kept, they attain a larger size, but are inferior in quality.* While the Hereford sheep remained pure and unmixed, they bore the finest fleece of any British sheep, and the nearest in appearance and quality to the Spanish wool. Their mutton had always an equal character for excellence; but no great quantity of it finds its way to the London markets. They have been of late years much crossed with Dishley tups, and are now more tender, and worse in constitution; formerly they were esteemed a very hardy race. On those farms where the feeders cot their sheep, they are either kept in the cot by night, all the year round, or in the winter months only, their food being pease, barley, oat or wheat-straw, in racks. These cots are low covered buildings, and will contain from one hundred to five hundred sheep, in proportion to the size of the farm, sheep-walk, or flock kept. The true Herefordshire breed are properly called RYELAND sheep, because the land, on which they are fed, was formerly thought capable of producing only rye—being a tract of very poor land, now, however, found capable of yielding most kinds of grain.

* Culley on Live Stock, p. 122.

THE HERDWICK BREED,

ARE so called from having been immemorially farmed in herds, at a yearly sum, upon certain mountain-farm, thence termed *Herdwicks*. They are peculiar to that high mountainous district, at the head of the rivers Dudden and Esk, in Cumberland, more particularly known by the names of Hardknot, Scalefell, and Wrey-nose. The property, both of the mountains and flocks, is in the lord of the soil, Lord Muncaster. The Herdwick sheep have faces and legs speckled, but a greater portion of white, with a few black spots, are accounted marks of the purest blood; fine, small, clean legs; a thick matted fleece of short coarse wool; the lambs when dropped well covered. They are very lively, well adapted to rocky and thin soiled counties, and in winter, in the severest storms and deepest snows, support themselves without hay, by scratching down to the heath or other herbage, instinctively finding out those parts of the mountain blown bare. Like other sheep, they do not face, but turn their back on the storm; and in such weather generally gather close together, and keep stirring about, and, therefore, they are seldom overblown, as they tread down the snow and keep above it.

THE DUNFACED BREED,

OF the Grampian hills, have faces of a dun or tawny colour, wool variously mixed and streaked, black, brown, red, and dun, some of it very fine, and short tails: these sheep are the smallest upon the island, many of them weighing only six or seven pounds per quarter; the mutton is excellent.

Probably these sheep are of Spanish origin, and might have been cast on-shore from the wrecks of the Spanish armada. The same kind of sheep are found in Spain, and are called *Ovejas Marinas*; and their wool, of which the fine Segovian cloths are made, is reckoned the finest in the world, except the Peruvian and Cashmirian. This breed is thought too tender for the severe climate of the Grampian hills, and that they will soon be supplanted by the Heath or Cheviot sheep; but they have been naturalized there for centuries, and no particular instances of defect of hardiness have yet been adduced.

THE CHEVIOT BREED

DERIVE their name from the Cheviot hills, a mountainous tract, from which, being well calculated for exposed situations, they have been introduced into the Highlands of Scotland, and some other northern districts. Their legs and faces are white, excepting when crossed with the Heath breed, which gives them speckled legs and faces, and sometimes small grisly horns. The pure Cheviot breed have a fine open countenance, with lively prominent eyes, a long body, largest on the hinder quarters, the fore-quarters being narrow and low, fine small-boned legs: the wool is partly fine, and in part of a coarse quality, each fleece averaging about three pounds, when killed at four years and a half old.

THE SHETLAND BREED,

THOUGH considered as a distinct race, is, probably, a kindred variety with the Dunfaced breed. They have unusually short and small tails, very fine wool, and of various colours. There are two varieties found in the Shetland islands, one carries coarse wool above, and soft fine wool below; and have three different successions of wool yearly; two resembling long hairs more than wool, called by the common people *fors* and *scudda*. When the wool begins to loosen at the roots, which happens about February, the hairs, or *scudda*, spring up; and when the wool is carefully pulled off, the tough hairs continue fast until the new wool grows up, about a quarter of an inch, then they gradually wear off; and when the new fleece has acquired about two months' growth, the rough hairs, termed *fors*, spring up and keep root until the proper season for pulling it arrives, when it is plucked off along with the wool, and, at dressing the fleece, is separated by an operation called *forsing*. The *scudda* remains upon the skin, as a thick coat or fence against the inclemency of the seasons.

The native breed are more tender than the other varieties, though both are hardy. In the winter season, while the ground is covered with snow, they eat seaweed greedily, and often, during long and severe snows, have little else to live on. Nature seems to have im-

parted a knowledge of the times when this food may be procured; for immediately upon the tide beginning to fall, the sheep run directly to the sea-shore, although feeding several miles distant from it, and remain until the tide returns, and obliges them to seek their usual haunts.

The wool of these sheep is short and open, and without a covering of long hair. These soft fleeces are liable to be rubbed off during winter, or early spring; but this might be prevented, by clipping the sheep, instead of the barbarous mode of pulling off the wool, which weakens the sheep, and decreases the length of the staple. Many believe that pulling the wool is unattended with pain or damage to the animal; but the case being directly the reverse, the lords of the soil should not allow so improper a practice to be continued.

The colours of Shetland wool are various: silver grey the finest and softest; the pure white, most valuable for all the purposes of the finest combing wool; the black, and the mourat or brown, very little inferior. The whole is of the softest texture, fit for the finest manufactures, and, in some instances, rivalling even Spanish wool; being somewhat longer in the staple, though less elastic. Stockings have been made of this wool at Aberdeen, sold for five or six guineas a pair: and such is its softness and lustre, that the skin with the fleece on makes a fur of great value, specimens of which have been sent to the China market.

The Shetland breed were formerly natives of the higher and northern parts of Aberdeenshire; but they have been crossed, probably to increase the size with the improvement of the soil, and are now confined to the Orkney and Shetland isles; the purest breed being found in the latter, where also are fed both long and short-woolled sheep, of the English and Welch breeds.

HORNED SHEEP.

THE MORF, OR SHROPSHIRE BREED,

HAVE small horns, with speckled, dark, or black faces and legs; they have the full character of real fine woolled sheep, and have been, for centuries, bred in Shropshire, Staffordshire, Worcestershire, and the vicinity. Their fleece is nearly all fine, and is superior to

Ryeland wool, since the crossing in that stock. Mr. Pitt, of Pendeford, in 1799, estimated the extent of Morf common, or waste, at 3,600 acres, and the number of sheep summered thereon at 15,800, to the annual profit of fifteen shillings per acre, in wool only, on a moderate calculation, eight fleeces and a half to the stone of 14lbs. Nothing is reckoned on account of carcase, as the sheep have some extra keep during winter. The Shropshire commons produce good fine wool, but none equal to Morf, by sixpence a-pound.

THE DORSETSHIRE BREED,

ARE chiefly confined to the county of Dorset, and to the neighbouring districts; they have the face, nose, and legs white; head rather long but broad, and the forehead woolly like the Spanish and Ryelands; the horns round and bold, middle-sized, and standing from the head; the shoulders broad at top, but lower than the hind-quarters; the back tolerably straight, carcase deep, and loins broad; legs not long, nor very fine in the bone. The Dorsetshire breeders carefully preserve the colour of their flocks from mixture, as white lambs are most esteemed in the London markets, from a presumed superior delicacy in the meat. This breed is considered one of the best, if not superior to all others, in England, considering its various qualities. Their property of bringing twins, making our highest prized house-lamb, must be considered first; they are both good hill sheep and good pasture sheep, and their flesh is an excellent medium between the delicate mutton of the hills, and the rich and juicy meat of the best low-land sheep. The latter Dorset lambs, when fattened, make the earliest grass-lamb.

THE EXMOOR BREED,

HAVE white faces and legs, with a delicate bone, head, and neck: they are very hardy, and the wool is very fine and long, averaging about four pounds per fleece. This breed is chiefly found on the forest of Exmoor and its vicinity, in the northern parts of Devonshire.

THE WILTSHIRE BREED.

THESE sheep are distinguished by large head and eyes, Roman nose, wide nostrils, horns bending down the

cheeks, colour white, back rather straight, substantial carcase, legs rather long, bone coarse, fine middle wool, very thin on the belly, which is sometimes bare. The basis of this breed is thought to be the Dorset, enlarged by some long-woolled cross: the Wiltshire sheep work well in the fold, and yield large, high-flavoured mutton. They are now, however, on the decline, being supplanted by the South Downs, of which the farmers can keep more than one and a half for one of the Wiltshire race, on the same quantity of land.

THE NORFOLK BREED.

THESE are fine-woolled heath sheep—natives, it is supposed, of the county whence their name, when it was a barren waste; but progressively improved through a series of years. Norfolk sheep have black faces, black or dark grey legs, large horns, of such size indeed, that some of their rams' horns, if straight, would each measure a yard long, and near a foot in compass at the base; narrow chins and backs, long and thin, but straight barrels, long legs, with much bone. A part of the light fleece of this breed is coarse, the best of it very fine. The flesh is excellent, but it does not stiffen well in hot weather, and though the cause is unknown, taints sooner than any other high-flavoured mutton. Probably, in a few years, this breed, as a distinct race, will not be found; as the South-Down sheep are extensively adopted by the farmers in that highly-cultivated county.

THE HEATH BREED,

HAVE large spiral horns, black faces and legs, a fierce wild-looking eye, short and firm bodies, well covered with coarse shaggy wool, averaging three or four pounds per fleece. They are an active, wild, and hardy race; run with amazing agility; and are best adapted, of all breeds, to exposed, heathy, and mountainous districts. The heath-sheep are natives of the north-west of Yorkshire, and of that mountainous tract of country contiguous to the Irish sea, from Lancashire to Fort William. Of late years they have been introduced into the western highlands of Scotland; and the black-faced Linton, or short sheep of Scotland, appears to be a variety of the Heath breed.

As sheep drink very little, they will thrive on mountains and upland downs, where water is scarce; and, indeed, they seem to delight in dry situations, which equally contribute to the flavour of their flesh, and the fineness of their wool. They are subject to various diseases; but when they escape both these and violence, their life is seldom beyond twelve or thirteen years; probably it might be prolonged to twenty years. A bell-wether in Kent lived full twenty-four years, his wool decreasing in quantity and quality with the increase of his years, until his body became bare in patches. The incipient decay of the teeth, or the broken-mouth, in sheep, infallibly indicates that their utility is on the wane; and that their keeper's, and the public profit, require them to be forthwith replaced by younger stock. Nevertheless, old ewes will breed good stock, and may be kept eight or ten years, should any particular purpose render such a measure desirable; but old rams are not to be depended on.

Dentition commences and is completed early with the lamb. Two of the front teeth fall, and are replaced by two broad, or sheep's teeth, at some period previous to the sixteenth month; sometimes within the first year. A similar renewal of two teeth takes place every succeeding year, until towards the end of the third, some time during the fourth, or in the commencement of the fifth year, when the sheep is full-mouthed, or aged, having acquired his eight broad teeth. The benefits, indeed, which mankind owe to these animals, are very numerous: their horns, flesh, tallow, fleece, and even their bowels, are all articles of great utility to human life. The horns are manufactured into spoons, and many other useful articles; the skin is prepared into leather for an inferior sort of shoes, for the coverings of books, for gloves, and for parchment; of the entrails, after proper preparation, are made strings for various musical instruments.

The milk of sheep is thicker than that of cows; and being rather of a strong taste, is mostly made into a rich and highly-flavoured cheese, which would be better was more attention paid to cleanliness in its preparation. The flesh is one of our most valuable articles of food; neither disagreeably coarse, nor yet so tender and

delicate as not to afford strengthening nourishment. The flesh of the lamb, at the proper season, is one of the greatest delicacies which even an epicure can desire.

The bones are useful for various purposes: of these, as well as of other bones when calcined, are made the cupels used in the refining of metals. Their dung is an excellent manure where they are folded in sufficient numbers upon the land; but the fleece is eminently serviceable to man, who is indebted to it for an essential part of his apparel; and the manufacture of the wool into cloths, has long formed one principal source of the riches of England. Hence it has become an important object to increase the quantity of fine wool.

THE BAT.

A SPECULATIVE philosopher, (not aware of the anatomical impossibility of success,) attempting, by light machinery, to exercise the power of flight, could not hit on a more plausible plan than copying the bat's structure; whose folding continuity of wing, with other peculiar conformations, cannot be contemplated without wonder. The bones of the extremities are continued into long and thin processes, and connected by a most delicate membrane or skin, capable, from its thinness, of contraction at pleasure, into innumerable wrinkles, so as to lie in a small space when the animal is at rest, and to be stretched very wide for flight.

The bat's nocturnal flight, with its general appearance, excites the idea of something hideous and dismal; and the larger animals of this species, in India and Africa, allowing for the license of poets, answer extremely well to the description of the ancient fabulous harpies.

The two most common species of bat in this country, are the *vespertilio murinus*, and *auritus* (common, and long-eared bat); the former, about the size of a mouse, or nearly two inches and a half long, measured from the nose to the tip of the tail; and the extent of the wings, fully expanded, about nine inches. It is of a mouse colour, tinged with reddish; the wings and ears black. The long-eared bat is similar, though smaller, and the fur has less red tinge; it chiefly differs in the size of its

ears, which are above an inch long, and of considerable width.

The bat is seen fluttering about in quest of its prey, in summer and autumn evenings, uttering a sharp note or scream during its flight. It chiefly frequents the sides of woods, glades, and shady walks; but it also skims along the surface of rivers and lakes, or wherever it can find gnats, moths, and other nocturnal insects. When in its flight it strikes against any object, and falls to the ground, it is easily caught. It may also be caught by throwing up the heads of burdock, whitened with flour. The bat pursues its prey with open mouth, and when satisfied, retires to its habitation, commonly the chink of a ruined building, or the trunk of a tree; where it sleeps away most of the day, even in summer; never venturing abroad by day-light, or in rainy weather; but when winter sets in, it becomes torpid, and remains till the return of spring.

On first perceiving the approaching cold weather, the bat seems to select a place where it may remain uninterrupted in lifeless inactivity during the winter, rather than where it may be warmly or conveniently lodged. Hence it is frequently seen hanging by its hooked claws to the roof of a cave, regardless of the surrounding dampness. This, indeed, seems the most eligible situation, as the occasional warm rays of the sun are excluded, and the animal is allowed to enjoy its long sleep, without being prematurely revived, as happens when its hiding-place is exposed to the external air, during a mild winter; or when the sun shines with unusual warmth on its abode. Thus, Nature wisely provides for all her children; by removing the necessity of food, when not to be procured; or, by enabling those not destined to be torpid, to migrate into countries where the supply of provisions equals the demands of life.

The bat brings forth in summer, from two to five at a time. Like the human kind, she has two nipples placed forward on the breast, to which her offspring adhere, and drain the milky juice; yet she makes no nest; but hooking herself against the sides of the apartment, she permits her young to hang at the breast till she grows hungry, when she fixes her little ones simi-

larly against the wall, to which they immediately cling, and patiently wait her return.

The bat, like the mouse, is capable of being reclaimed to a certain degree; and one that had been domesticated would take flies out of a person's hand. If you gave it any thing to eat, it brought its wings before its mouth, hovering, and hiding its head, like birds of prey when they feed. The adroitness it shewed in shearing off the wings of flies, which were always rejected, was worthy of observation. Insects seemed most acceptable, though it did not refuse raw flesh, when offered; so that the story of bats going down chimnies to gnaw people's bacon, seems probable. The vulgar opinion, that bats when down on a flat surface, cannot get on the wing again, it several times confuted, by rising from the floor. It ran with some dispatch, but in a most ridiculous and grotesque manner.

Bats drink on the wing, like swallows, by sipping the surface as they play over pools and streams. They frequent waters, not only to drink, but because insects are found over them in great plenty. A person going some years ago, in a boat from Richmond to Sunbury, late on a warm summer's evening, saw myriads of bats between the two places: the air swarmed with them all along the Thames, so that hundreds were in sight at a time.

Spallanzani having observed that bats would fly in the darkest chambers with precision, and not even touch the walls, tried several species, and found them equally exact in their motions when their eyes were closely covered; at length he cruelly destroyed the eyes, and covered the socket with leather; even in this state the animal continued to fly with the same precision as before, avoiding the walls, and cautiously suspending flight in seeking where to perch. It even flies out of a door without touching the architraves.

Mr. Carlisle having collected several specimens of the long-eared bat, he observed that when the external ears of the blinded ones were closed, they hit against the sides of the room, without being aware of their situation. They refused every species of food for four days, as did a larger number afterwards caught and preserved

in a dark box above a week. During the day-time, they were extremely desirous of retirement and darkness; and, while confined to the box, never moved or endeavoured to get out during the day, and when spread on the carpet, they commonly rested some minutes, and then beginning to look about, crawled slowly to a dark corner or crevice. At sunset the scene was changed: every one endeavoured to scratch its way out of the box; a continued chirping was kept up, and when the lid of their prison opened, each was active to escape, either flying away immediately, or running nimbly to a place convenient for taking wing. When these bats were at first collected, several of the females had young ones clinging to their breasts in the act of sucking. One flew with perfect ease, though two little ones were thus attached, which weighed nearly as much as their parent. All the young were without down, and of a black colour.

The bat is, in this country, an innocent and inoffensive creature. The general tenor of its industry is to pursue insects, of which it diminishes the number; while its evening flight amuses the imagination, and adds another figure to the pleasing group of animated nature. In the warmer climates, however, both of the eastern and western world, bats are truly formidable; each singly, is a dangerous enemy; but united in flocks truly dreadful.

The *Vampyre*, or spectre of Guiana, called also the flying-dog of New Spain, and by the Spaniards *Perro-volador*, is a bat of a monstrous size, which sucks the blood of men and cattle while asleep. Captain Steadman, who had nearly fallen a prey to one, gives the following account of their mode of attack:—Knowing, by instinct, that the person they intend to attack is in a sound slumber, they generally alight near the feet, where, while the creature continues fanning with his enormous wings, which keeps one cool, he bites a piece out of the tip of the great toe, so very small indeed, that the head of a pin would scarcely go into the wound, which is, consequently, not painful; yet, through this orifice, he continues to suck the blood until he is obliged to disgorge. He then begins again, and thus continues sucking and disgorging, till he is scarcely able to fly;

and the sufferer has often been known to sleep from time into eternity. Cattle they generally bite in the ear, but always in places where the blood flows spontaneously.

THE SEAL.

OF the three species of seals that frequent our coasts, only the common seal (*phoca vitulina*) is found in any abundance; and this, principally, on the most rocky and uninhabited shores of Scotland and Ireland. About the Land's End, in Cornwall, they are more numerous than on any other coast of South Britain, unless a few parts of Wales; and, sometimes, individuals are found off Cumberland, Lancashire, and other maritime counties.

The usual length of the seal is from five to six feet. The body is closely covered with short hair of various colours, smooth, and shining; its tongue is forked at the end; it has two canine teeth in each jaw, six cutting teeth in the upper, and four in the lower; and five toes on each foot, furnished with strong, sharp claws, for climbing the rocks, on which it often basks.

The common seal, even when taken old, is capable of being domesticated. A seal caught on the Welsh coast, and sent by water to London, was brought to St. Bartholomew's hospital. During the voyage it had been fed mostly upon milk; and on arrival, it had become so familiar, as to suffer the man who brought it to play with it like a dog, and would lick his hands or face with great complacency; and such was its attachment, that after his departure from the hospital, it for some time emitted a melancholy noise, evidently bemoaning its loss; and died in the ensuing week.

A live seal caught below Yarmouth, was brought to Ipswich, and carried about in a basket, as a show. Dr. Hamilton saw and examined it. The animal was so gentle as to suffer him, though a stranger, to stroke its head; while it turned quickly about, with open mouth, like a dog in the act of playing, rolling its fine black eyes, as if greatly delighted. It also allowed him, without any difficulty, to examine its fore-feet; and to extend, in order to view their structure, the webs of the hind ones.



The Seal.



Seal Catching.

In Cornwall, when persons pursue the seal, it is a common practice, on the animal thrusting its head above water, to halloo to it, till they can approach within gun-shot; as it will continue for many seconds to listen to the sound. The seal, indeed, displays a taste for music, scarcely to be expected from his habits and local predilections. It will long follow a boat in which any musical instrument is played, and even a tune simply whistled has attractions.

The coast of Caithness, Scotland, is well known for the pursuit of seals. The immense caverns on this coast are much resorted to by the seals, during the breeding season, in October or November. About midnight, the hunters, with torches and bludgeons, enter the caverns: having roused the flock, and suffered the large ones to escape, they despatch most of the young seals by a slight blow on the nose, which immediately destroys them. On the west side of North Uist, more than three hundred have been killed at a time.

When the dam suckles her young, she sits upon her hind legs: she has but four teats, and consequently never brings forth, at a litter, more than three or four, which, at first, are clothed with a fine white woolly hair. The mother attends the young, where they are brought forth, for fourteen or fifteen days, after which, she brings them down to the water, and accustoms them to swim, and provide for their own subsistence; and, sometimes, the parents carry the young out on their backs to sea, and push them off repeatedly, till they are initiated in swimming.

THE GUINEA-PIG.

THIS little animal, of which numbers are domiciliated in England, is a native (not of Guinea, but) of Brazil, whence it was imported into Europe. The Guinea-pig (*cavia cabaya*) is tamed with facility, is inoffensive, timorous, and particularly cleanly; it is not, however, susceptible of strong attachments to its benefactors; nor remarkable for docility.

The Guinea-pig is a most prolific animal, and in twelve months, in their wild state, one thousand might be produced from a single pair, as the female has been

known to bring forth at two months old only, and the time of gestation is only three weeks; and she will produce every two months. They are six or seven months before they arrive at their full growth. Their food is all kinds of herbs, but particularly parsley, apples, and other fruit. Cats are their natural enemies; but their haunts being supposed exempt from the inroads of rats, Guinea-pigs might be usefully reared in country places infested with these predatory animals, as they afford a palatable and wholesome food. In a domestic state they are very restless, and make a continued noise, similar to the grunt of a young pig.

THE DORMOUSE AND MOUSE.

The scatter'd gleanings of a feast
 My frugal meals supply :
 But if thine unrelenting heart
 That slender boon deny,
 The cheerful light, the vital air,
 Are blessings widely given ;
 Let nature's commoners enjoy
 The common gifts of heaven.

BARBAULD.

THE dormouse is an elegant little creature, and sometimes taken under the protection of man. It has full, black eyes; ears round and thick; and the tail, two inches and a half long, is covered with hair. The body is about the size of the common mouse, but more plump; and the colour is a tawny red, except the throat, which is white.

The common dormouse (*myoxus muscardinus*) is a native of most parts of Europe. It builds near the bottom of a thick hedge, with either moss or the leaves of trees, and subsists on nuts, which it eats in an erect posture, like the squirrel. At the commencement of winter it rolls itself up, and, in a torpid state, lies in its retreat, till revived by the genial heat of returning spring; though sometimes, when the weather proves unusually mild, or when brought near a fire, it recovers its vital energies; but on the exciting cause being removed, it relapses into its former insensibility. The female forms her nest of moss, dead leaves, &c. and brings forth three or four, in May or June. The dormouse never frequents the habitations of man.



The Guinea Pig.



Feeding Guinea Pigs.

THE COMMON MOUSE.

O hear a pensive prisoner's prayer,
 For liberty that sighs ;
 And never let thine heart be shut
 Against the wretch's cries !
 For here forlorn and sad I sit
 Within the wiry grate ;
 And tremble at the approaching morn
 Which brings impending fate.

THIS active, but timid and cautious creature, is so entirely domestic as never to be found in fields, or where the country is uninhabited by man. Fearful by nature, but familiar from necessity, it attends on man; and only in searching for its food, quits its retreat. It may be tamed to a certain degree, but never entirely loses its timidity.

The common mouse (*mus musculus*) is uncommonly prolific, producing five or six young several times in the year. There are several varieties, distinguished by their colour, as black, yellowish, spotted, &c.; but the most rare and beautiful are white, with red eyes; they are capable of being, in some degree, tamed by music, to which all mice are singularly attached.

These little depredators may be destroyed by the common traps, baited with cheese: in barns, by singed leather, grease, or other animal food; and, in chambers where cheese is preserved, by malt-meal. This method, however, is useful:—knead a few handfuls of wheaten flour, or malt-meal, into dough; let it grow sour in a warm place, and then mix with it finely levigated iron-filings; form the whole into small balls, and put them into the holes frequented by mice. By eating this preparation, they inevitably die.

The mouse is ingenious in constructing its nest; and has sometimes made it of most expensive materials. In January, 1814, Mr. Thomas Lang, of Littleton, a respectable blanket-manufacturer, deposited, in a drawer in his desk, two bills of exchange value upwards of 70*l*. Mrs. Lang, having to refer to the bills, went to the drawer; but, to her great consternation, no bills could be found. Every article in the desk was turned over, and the search was continued till midnight, and resumed next morning unsuccessfully. When all hopes

of finding the lost property had vanished, a neighbour coming in, on hearing the story of the loss, removed the desk; and on the back was discovered a small aperture. On continuing the search, a similar hole was found in the floor, and, on removing the flags, a mouse's nest was discovered, with the lost notes in it, almost reduced to their original rags; and which the mouse, with great ingenuity, had converted into a very comfortable lining; but, fortunately, the bills, though torn into very minute pieces, retained sufficient of the writing to ascertain their identity.

THE LONG-TAILED FIELD MOUSE.

Once on a time (so runs the fable)
 A country mouse, right hospitable,
 Received a town mouse at his board,
 Just as a farmer would a lord.
 A frugal mouse, upon the whole,
 Yet lov'd his friend, and had a soul,
 Knew what was handsome, and would do't,
 On just occasion, *coute qui coute*.

THE long-tailed field mouse (*mus sylvaticus*) measures from eight to nine inches, including its tail. These animals, found in fields, gardens, and shrubberies, do incalculable damage; burrowing under the ground, and digging up newly-sewn grain, acorns, pease, beans, &c. which they carry to their subterraneous granaries. Their habitations may be discovered by the small mounds of earth, raised on, or near, the entrance; or by the passages leading to their nests, or storehouses: and, by following the course of such passages, the vermin may be easily destroyed.

THE HARVEST MOUSE.

Our courtier walks from dish to dish,
 Tastes for his friend of fowl and fish;
 Tells all their names, lays down the law,
Que ça est bon! Ah, goûtez ça!
 That jelly's rich, this malmsy heating,
 Pray dip your whiskers and your tail in.

THE harvest mouse (*mus messorius*) is small and slender: its whole length, with the tail, not exceeding five inches. It is found, and is very numerous, in Hampshire, especially during the harvest. Its nest is circular, formed with blades of corn, which it deposits above the surface of the ground, between the straws of stand-

ing grain, and frequently in thistles, where the female produces from six to eight young ones at a time.

Harvest mice never enter houses, but are often carried into ricks, among sheaves of corn; one hundred have been found in one rick, on taking it down to be housed. Those remaining in the field shelter themselves during the winter beneath the ground, into which they burrow deeply, forming their beds or nests of decayed grass. They may be taken by traps. This singularly curious and interesting species was first discovered in Hampshire, by Mr. White, about the year 1767.

THE MEADOW MOUSE.

If e'er thy breast with freedom glow'd,
And spurn'd a tyrant's chain,
Let not thy strong oppressive force
A free-born mouse retain.

BARBAULD.

THE meadow mouse (*mus avalis*) is from three to six inches long; dwelling in bushy places, corn-fields, meadows, and gardens, chiefly near water. It subsists on nuts, acorns, pease, and grain, which last it prefers to every other kind of food, collecting considerable quantities in its subterraneous residence. When the corn is ripe, the meadow mice assemble in corn-fields, and with their teeth commit great ravages, by cutting down the stalks of corn, and robbing the ears; nay, they follow the reapers, consume all the fallen or neglected grain, and when the gleanings are devoured, they flock to the newly-sown fields, and destroy the crop of the succeeding year. Being very prolific, the females produce from eight to twelve at a litter, several times in the year. During the winter, they retire to woods, coppices, &c. where they subsist on acorns, hazel-nuts, and the seeds of trees.

In some seasons, the meadow mice become so numerous as would consume every esculent, did they not destroy each other. Hence, in unproductive years, their numbers are greatly diminished, not only by devouring their own species, but also by becoming the prey of the long-tailed field mice, of foxes, wild cats, weasels, and especially of dogs.

BRITISH BIRDS.

LECTURE LXV.

When first the soul of love is sent abroad,
Warm thro' the vital air, and on the heart
Harmonious seizes, the gay troops begin,
In gallant thought, to plume the painted wing;
And try again the long-forgotten strain,
At first faint warbled. But no sooner grows
The soft infusion prevalent, and wide,
Than, all alive, at once their joy o'erflows
In music unconfin'd.

THOMSON'S SPRING.

BIRDS are the most beautiful of the animated tribes, and from them man has nothing to fear. They embellish our forests, and amuse our walks; their pleasures, notes, and even their animosities, enliven the general face of nature, and cheer the contemplative mind.

In no part of animated creation is divine wisdom more apparent than in this. Birds, by their structure and habits, are admirably adapted for their station. To compensate their want of strength, they are supplied with swiftness; and, to avoid those enemies they are not fitted to oppose, they possess the faculty of ascending into the air. They appear, indeed, entirely formed for a life of escape; every part of their anatomy being calculated for swiftness; and being designed to soar on high, all their parts are proportionably light.

Though, in the scale of nature, birds are inferior to quadrupeds, as less powerful, useful, and capable of imitating human endowments, yet they far surpass fishes and insects, in the mechanism of their bodies, and their superior sagacity, and aptitude to receive instruction.

In proportion to the perfection of animals, the species are fewer. The varieties in the human race arise rather from food and climate than from nature; of qua-

drupeds, the kinds are numerous; birds are yet more various still; and fishes yet more; while the insect tribes are so immensely extended, that they elude the researches of the most inquisitive.

Between quadrupeds and mankind there is a little resemblance in their internal structure; but, in this respect, birds are entirely dissimilar. Formed principally to inhabit the empty regions of air, all their parts correspond with that design; their bodies being sharp before, to facilitate their passage through the yielding element, swelling in the middle, and terminating in expansive tails, which serve to keep them buoyant, while their fore-parts are cleaving the air. Hence they have been compared, not inaptly, to a vessel making its way through the waves; the trunk of the body of the animal answering to the hull, the head to the prow, the tail to the rudder, and the wings to the oars.

The position of the feathers of birds, over each other, and arranged from the forepart backwards, wonderfully aid them in cutting their way through the air; and for the purpose of yielding warmth to the body, a short soft down fills up all the vacant spaces between the shafts of the plumage. Their elevation from the earth is also aided by their bones being hollow, and consequently light; and that they may have every facility for rising, their heads are generally small, their necks long and flexible, and the body sharp on the under side, and flat or roundish on the back.

The wings again, by which they obtain a progressive motion, are constructed for great expansion, in striking downwards, while the moving muscles are very large. Hence, for a bird to rise from the ground, it leaps, stretches its wings from the body, and strikes them downwards so forcibly that they are put into an oblique direction, partly upwards, and partly horizontally forwards. This process is repeated, according to the pleasure of the bird, which can, without difficulty, rise or fall, retain its equipoise, or turn to the right or to the left.

The centre of gravity in birds being a little behind the wings, most of them, in flying, thrust out their head and neck. The heron, however, whose head and neck are long, always contract th

or they would overbalance the rest of the body, while the long legs are extended to maintain an equipoise.

Another instance of the wonderful economy of nature, is obvious in that wise provision to preserve the feathers of birds from violent attrition against the air, or injury from the moisture of the atmosphere; by being furnished with two glands behind, containing oil, which they occasionally press out with their bills, and spread over such parts of their plumage as require smoothing. Poultry, however, living mostly under cover, and seldom expanding their wings in flight, have less of this fluid than those which frequent the open air. The hen's feathers, for instance, are pervious to every shower, but those of a swan, goose, duck, or other aquatic fowl, are dressed with oil from the first day they leave the shell; and thence their flesh sometimes contracts a very rank flavour.

All the senses of birds, except that of tasting, seem very acute. The sight and smell are particularly exquisite; and the eye for protection from external injury has a winking membrane, which can at pleasure be drawn over the whole organ of sight.

No part of the globe is destitute of this elegant addition to its scenery;—birds are found of some tribe or other, adapted to every climate. Some species, indeed, are confined to particular countries; others are widely diffused; and, at particular seasons of the year, either from a defect of food, or the want of a secure and suitable asylum for their young, many migrate annually in large companies, following some chosen leader during the day, and making a continual cry in the night, that they may not divide.

Of such migratory birds as may be considered indigenous, the most remarkable are the swallow tribe, goat-sucker, cuckow, nightingale, wheatear, red-start, land-rail, quail, fieldfare, red-wing, woodcock, snipe, and the Royston crow. The retreat of some of these has been well ascertained; but the observations of nearly two thousand years have not removed the veil of mystery from this part of the natural history of others.

Though the notes of each species of birds are nearly uniform, experiments show them to be less innate than acquired. A common sparrow, taken very young from

the nest, and placed near a linnet and goldfinch, adopted a song, a mixture of the notes of both its instructors. And three nestling linnets, educated, one under a skylark, another under a wood-lark, and a third under a tit-lark, forgot the song peculiar to their own species, and each adhered entirely to that of its tutor.

Every copse
 Deep-tangled, tree irregular, and bush
 Bending with dewy moisture, o'er the heads
 Of the coy quiristers that lodge within,
 Are prodigal of harmony.

The music which fills the groves during spring, generally proceeds from the tuneful throats of the males, and is expressive of love and endearment to their mates. Among our most distinguished British woodland songsters, in order of merit, stand the nightingale, sky-lark, wood-lark, tit-lark, linnet, goldfinch, chaffinch, greenfinch, hedge-sparrow, aberdavine, red-pole, thrush, black-bird, bullfinch, red-start, robin, wren, reed-sparrow, and blackcap. Some of these are pre-eminent in mellowness of tone, others in sprightliness, plaintiveness, compass, or execution; but in all these points the nightingale remains without a rival, and, among birds, may justly be styled the queen of harmony. The music of the feathered choirs, however, almost ceases about the end of June, though some resume their song in autumn, and a few cheer the gloomy hours of winter with their melody.

All birds are oviparous, or produce eggs; after a certain period of incubation, their young are extruded. These eggs differ in their kinds, in number, figure, and colour. They contain the rudiments of the future animal, for whose maturation and perfecting by incubation a bubble of air is always at the large end, between the shell and the inside skin. The warmth communicated to this confined air by the sitting bird, gives its spring an extraordinary increase, and at the same time puts its parts into motion. Hence, to the substance of the egg, are communicated pressure and motion, which, in some unknown manner, gradually promote the formation of the young, till the time of its exclusion.

The use of that part of the egg, called the treadle, is not only to retain the different liquids in their proper places, but also to keep the same part of the yolk in one

uniform position, however the egg be turned. The principle of its action may be thus explained : the treadle is specifically lighter than the white in which it swims ; and being connected to the membranes of the yolk, at a point rather out of the direction of its axis, causes one side to be heavier than the other.—The yolk being thus made buoyant in the white is, by its own heavy side, kept with the same part always uppermost.

The nests of birds mostly are constructed with abundant art, and adaptation ; and in this important concern, both male and female assist. Each brings a share of materials to the place—coarser substance to form the foundation and exterior, and then wool, hair, or the down of animals or plants, to form a soft and commodious bed for the eggs and future young. In short, the act of nidification is one of those surprising natural contrivances which evinces the plastic hand of a creating and superintending Power to no common degree :

Mark it well : within, without,
No tool had he that wrought ; no knife to cut,
No nail to fix, no bodkin to insert,
No glue to join ; his little beak was all.
And yet how neatly finish'd : What nice hand,
With every implement and means of art
And twenty years apprenticeship to boot,
Could make me such another ? Truly then
We boast of excellence, whose noblest skill
Instinctive genius foils.

HURDIS.

But, however astonishing instinct is, it cannot be put in competition with reason. The reasoning powers ever aim at perfection, by opening new avenues of knowledge, while instinct is fixed, and neither advances nor recedes. Birds of the same species build their nests now, as they did a thousand years ago ; from experience they gain little or nothing, instinct alone being their guide ; whereas reason makes experiment the foundation of its deliberations, when any thing new is to be attempted ; and therefore is perpetually adding something to the collective stores of wisdom.

The grand natural divisions of birds are into LAND and WATER BIRDS, each of which have been subdivided into several orders, or families.

We shall begin with those of the rapacious kind, or birds of prey; whose distinguishing characters are,—the bill is hooked; the feet are strong, and armed with three hooked fore-claws, and one back; the female, contrary to the common course of nature, is both larger and stronger than the male, builds her nest in lofty situations, and seldom associates with any others of the kind, except her mate.

The ferocity of rapacious birds renders them destructive, not only to animals of their own class but frequently to their young, which are expelled from the nest before they are well able to provide for themselves. Hence birds of this order are unsociable; and though they evince sufficient attachment to their mates, the difficulty of procuring food keeps them from assembling in flocks. Their flesh is lean, tough, and ill-tasted, in flavour commonly resembling the animals they devour; and, leading a life of hostility, they are shunned by the feathered race in general, while few of the species are useful to man.

THE EAGLE.

Swifter than lightning downward tending,
An eagle stoop'd of mighty size,
On purple wings descending:
Like gold his beak, like stars shone forth his eyes,
His silver breast with snow contending vies.

CONGREVE.

THE eagle is the noblest, and most generous of rapacious birds. Its native fierceness renders it almost impossible to train it for the chase, though the Orientals anciently so employed it. But its form and habits disqualify it for being an auxiliary in our sports; and even when deprived of liberty, it must be confined with a chain, or it would be dangerous to those who approach it.

Of all birds, the eagle flies the highest; whence the appellation and character of the “bird of heaven,” and messenger of Jove. His sight being most exquisite, he chases by the eye, and darts on his prey with irresistible fury and unerring aim; easily carrying off geese, lambs,

and kids; and often he attacks fawns or calves, rather to glut himself with their blood, than to transport them, except in fragments, to his aerie, or nest, formed of such durable materials that it seldom wants repair, and generally serves during life, unless destroyed. It is several feet in breadth, composed of sticks, laid flat, on the dry and inaccessible point of a rock, and lined with reeds or brambles: in this the female deposits two or three eggs, on which she sits for thirty days. Seldom, however, are more than two eaglets produced. By a wise provision of nature, the more innocent animals are prolific; while the dangerous are marked with certain infecundity. Seldom does the eagle rear more than one, from the difficulty of procuring food, and its voracious disposition, especially during the season of incubation, at which season the eagle spreads devastation among kids, lambs, and every sort of game.*

Eagles were formerly extremely numerous and destructive in the northern parts of Britain; for there is a law which entitles a person that kills an eagle in the Orkneys, to a hen out of every house in the parish where the exploit was performed.

The colours of the eagle become stronger and deeper till it is at full maturity; but age, famine, long captivity,

* In the county of Kerry a poor man procured a comfortable subsistence for his family, during a summer of famine, by robbing the eaglets of the food which their parents carried to the nest; and to protract their period of imbecility, and retard their flight, he contrived to clip their wings, by which his supplies were longer continued. This, however, was a dangerous undertaking, for Goldsmith says, "It happened some time ago that a peasant resolved to rob an eagle's nest built in a small island, in the beautiful lake of Killarney. He accordingly stripped and swam in upon the island, while the old ones were away; and having robbed the nest of its young, he was preparing to swim back, with the eaglets tied in a string. But while he was yet up to the chin in the water, the old eagles returned, and, missing their young, quickly fell on the plunderer, and, in spite of all his resistance, dispatched him with their beaks and talons."

Martin, in his history of the Western Isles, records instances of two children that were carried off by eagles at the breeding season, but fortunately the theft was early discovered, and the children were restored unhurt to their distracted parents. Probably some similar incident originated the fable of Ganymede's being snatched up into heaven by an eagle.



The Eagle.



The Sparrow Hawk.

and disease, whiten its plumage. It is supposed to live an hundred years; and certainly it is a long-lived bird, no less remarkable for its abstinence than its longevity. Pennant mentions one which Owen Holland, Esq. of Conway, had kept nine years, and the gentleman from whom he received it, thirty-two; having obtained it from Ireland, but at what age was not known. The abstinence of this bird was put to a cruel test by the servant neglecting for twenty-one days successively to give it any food.

When reduced to a state of captivity, the eagle will eat any kind of flesh offered, and even devour bread, serpents, and lizards. As he generally remains half savage, he will attack dogs, cats, and sometimes even men, that come within his reach; though he seldom wholly loses his ferocity, some instances are recorded of his docility, his attachment to his benefactors, and his indignant sense of injury towards his tyrants.*

THE COMMON EAGLE,

FREQUENTLY called the *ring-tail* eagle, is of a rusty brown colour, with a white transverse band over the tail. It is very destructive among young animals. It is somewhat larger than a turkey-cock, and it inhabits Europe, America, and the north of Asia; is frequent in the Highlands of Scotland, where it builds in precipices and sea-rocks, retaining its original nest, unless dislodged by violence. In the Orkneys, a pair have occupied the same spot beyond the memory of man.

THE GOLDEN EAGLE

Is of a dark brown colour, irregularly barred; the tail is black, waved with ash-coloured bars, and the feet are

* A gentleman in the south of Scotland had a tame eagle, which the keeper one day, for some petty offence, thought proper to lash with a horse-whip. About a week afterwards, the man chanced to stoop within reach of its chain, when the enraged animal, recollecting the late insult, flew in his face with such fury and violence, that he was terribly wounded, but luckily by the blow driven back far out of all farther danger. The screams of the eagle alarmed the family, who found the keeper in a woeful plight, and the enraged and victorious animal pacing about in the most majestic manner. Each was anxious for his own safety, lest in his rage he should break loose; and they had no sooner retired, than he snapped his chain, and escaped for ever.

downy, of a rusty yellow colour. It is a native of Europe, and known in some of the mountainous parts of Great Britain and Ireland; being about three feet long, and the expansion of its wings upwards of seven feet. It has been supposed to bear the same dominion over birds, which is commonly attributed to the lion over the quadrupeds. "Magnanimity is equally conspicuous in both: they despise the small animals, and disregard their insults. Both are remarkable for their temperance, and seldom devour the whole of their prey, but leave the fragments to other animals. Though famished, they disdain to feed on carrion."—*Buffon*.

The golden eagle builds its aerie in elevated rocks, ruinous and solitary castles and towers, and other sequestered places. Some of its habits are well described in the following lines:—

High from the summit of a craggy cliff,
Hung o'er the deep—such as amazing frowns
On utmost Kilda's shore whose lively race
Resign the setting sun to Indian worlds—
The royal eagle draws his vigorous young,
Strong pounc'd, and ardent with paternal fire;
Now fit to raise a kingdom of their own,
He drives them from his fort, the towering seat,
For ages of his empire.

THOMSON.

THE SEA-EAGLE, OR OSPREY.

THE prevailing colour of the sea-eagle is ferruginous; the inner vanes of the tail-feathers are white; the cere is yellow, and the feet are half covered with down. It frequents the Highlands of Scotland, and the Orkneys; and in size it equals the largest eagles. Hence it is often confounded with the golden eagle, to which, indeed, it bears a strong resemblance, though its habits are very different.

The osprey feeds principally on fish, which it seizes by darting down upon them, when swimming near the surface of the water, its talons being perfectly adapted to its way of life. This bird fastens its talons in and thus carries off salmon, which often rise to the surface of the water; and it also preys on aquatic fowl. It builds on the shore, or on the margins of rivers, and lays three or four white elliptical eggs. One that had its aerie in Westmoreland, soared aloft in the air with a cat in its

talons; the resistance of the cat, however, obliged the eagle to descend, and each being unwilling to quit its hold, they were taken up together.

THE KITE

Is easily distinguished from other rapacious birds, by his forked tail, and slow floating motion. Flying seems his only pleasure: he seldom rests, and spends almost his life in the air. Sometimes he continues aloft without any apparent motion of his wings, regulating his evolutions by his tail: he rises without effort, and descends as if sliding along an inclined plane. In short, all his motions are calculated to excite admiration; yet with all this facility in flying, he seldom chases, and any bird can easily make good its retreat by swiftness. He is an insidious thief that prowls about in quest of easy prey. When he finds a bird wounded, or a young chicken astray from the parent hen, the kite employs the hour of calamity, and, like a famished glutton, shews no mercy, hence he is seen in the vicinity of cottages where poultry are kept; and of all winged animals is a most unpleasant neighbour.

Kites were kept formerly in France to entertain the royal family, by their combats with the sparrow-hawk, or falcon: before which, though much smaller, they would fly in the most dastardly manner; rather vanquished by their own fears than the force of their enemy.

Kites usually breed in large forests, or in woody mountainous countries. They are about twenty-seven inches long, and the expansion of the wings is nearly five feet. Bacon observes, that this bird flying high, presages fine weather. It continues in England the whole year, and is not uncommon.

THE COMMON BUZZARD,

A WELL-KNOWN bird, is about twenty inches in length, and four and a half in breadth. The body is brown, the belly a pale colour, with brown spots, and the cere and feet yellow.

The buzzard is so named, because of a dull and indolent disposition; hence its name is used to reproach such persons as resemble it in those respects. It will continue many hours perched on a tree or eminence,

from whence it darts upon such prey as comes within its reach. It feeds on birds, mice, reptiles, and insects; but though possessed of strength and agility, will fly from a sparrow-hawk, and when overtaken, will suffer itself to be beaten, and even brought to the ground without resistance.*

The buzzard is common in this country. It breeds in large woods, generally fixing on an old crow's nest, which it enlarges and lines inside with wool and soft materials. It feeds and tends its young, seldom more than three, with great assiduity. Ray asserts, that if the female be killed, during the season of incubation, the male buzzard will undertake the charge of rearing the progeny, and take care of them till they can provide for themselves. And the young accompany the old ones some time after leaving the nest.

THE GOSHAWK.

————— or where the hawk,
High, on the beetling cliff, his eyrie builds.

THOMSON.

AMONG predaceous birds, the kite and buzzard are reckoned ignoble; while the falcons and hawks, from their high spirit and greater docility, were once in much esteem, and greatly contributed to the amusement of our ancestors. The diversions of mankind, however, varying with their improvement from rudeness to civilization, hawking is now little practised, and we feel little interest in birds formerly bought at a great price, and still highly valued in other parts of the world, where they constitute the principal amusement of men of rank. On the coast of Barbary, among the Arabs, in India, Persia, and Japan, hawking is cultivated above every other sport:

* The buzzard may be tamed, and rendered a faithful domestic. Buffon mentions one which was so docile, that it slept every night on its master's window, constantly attended him at dinner, sat on a corner of the table, and often caressed him with its head and bill, emitting a weak sharp cry, which it could soften at pleasure. One day it followed its protector, who was on horseback, flying above his head, for upwards of two leagues. It shewed a marked aversion both to cats and dogs, and in its contests with them always came off victorious. It had a singular antipathy to a red cap on the head of any peasants, and would frequently whip them off, to the astonishment of the wearer.

and in Britain, some centuries ago, a nobleman scarcely ever stirred from his house without a hawk on his arm. It was then thought sufficient for youth among the grantees to wind the horn, carry the hawk fair, and leave study and learning to meaner people. In every country of Europe, indeed, falconry was so highly esteemed, that the emperor Frederick did not think it unbecoming his dignity to write a laborious treatise on the subject.*

Among those falcons anciently trained to the chace, the goshawk was much esteemed, and trained principally to pursue cranes, geese, pheasants, and partridges. It is distinguished by a brown body, the tail-feathers barred with pale bands, a white line over the eye, a black cere, and yellow feet. It builds in lofty trees; and darts on its prey with vast impetuosity; but if the object of pursuit eludes its first attack, it almost immediately desists, and perches on some bough, till fresh game presents itself.

THE PEREGRINE FALCON

Is still used by the few gentlemen who delight in hawking, and its swiftness and spirit excellently capacitate it

* The game laws, which arose in times of feudal tyranny and barbarity, and the last bulwark which resists the encroachments of freedom, peculiarly encouraged hawking, which at once displayed the pride of the rich, and the slavery of the poor. In the reign of Edward III. it was made felony to steal a hawk; and to take its eggs, even in a person's own grounds, was punishable with imprisonment for a year and a day, besides a fine at the king's pleasure. Elizabeth reduced the period of imprisonment to three months; but the offender was to find security for his good behaviour for seven years, or lie in prison till it was procured. "Such was the enviable state of the times in England. During the whole day, the gentry were employed with the fowls of the air, or the beasts of the field. In the evening they celebrated their exploits with the most abandoned and brutish sottishness. At the same time the inferior ranks of people, by the most unjust and arbitrary laws, were liable to capital punishment, to fines, and the loss of liberty, for destroying the most noxious of the feathered race."—*Pennant*.

This amusement, however, cost very dear, and in the ruin it sometimes occasioned, justice was satisfied for the arbitrary principles by which it was secured. In the reign of James I. Sir Thomas Manson is said to have given a thousand pounds for a cast of hawks; an astonishing sum, if we consider the value of money in that age.

for the purpose. The body is ash-coloured above with brownish bands, reddish white below with blackish bands; the tail spotted with white, the cere and feet yellow.

This species breeds among the rocks in Caernarvonshire, and has long been famous for producing a generous race, and is very common in the north of Scotland. Its flight is inconceivably rapid. One that had been trained in Angus-shire, having escaped with two heavy bells appended to each foot, was killed in less than two days afterwards, at Mostyn in Flintshire.

THE HEN HARRIER

Is about seventeen inches long, and the expansion of the wings is three feet. The bill black, cere yellow, upper parts of the body bluish grey, under parts white; eye-lids yellow, and an arched line surrounds the throat.

It frequents forests, heaths, and other sequestered places, especially near marshy grounds, where it destroys numbers of snipes and other birds fond of watery situations; indeed, it is very destructive to birds, and especially to young poultry. It generally skims along the ground in search of its prey, which includes every animal it can manage.

A bird of this kind, shot some years ago near London, was first observed dodging round the lower parts of some old trees, and now and then seeming to strike at their trunks with its beak and talons, but still continuing on the wing. After it was killed, the reason of this manœuvring was accounted for; on opening its stomach near twenty small brown lizards were found, each torn into two or three pieces. These birds never settle on trees, but breed on the ground in the Cheviot hills, and usually produce four young at a time.

THE SPARROW-HAWK, (*Falso Nisus*).

THIS elegant and docile bird, the most pernicious we have, has a green cere, yellow feet, white belly undulated with grey, and the tail marked with black hairs. The male is about twelve inches long, and the female fifteen.

The sparrow-hawk possesses great intrepidity and sagacity, and is very depredatory among young poultry

from which it is not to be deterred, even by the presence of the human race. Yet it is one of the most tractable and affectionate birds of its race. A naturalist says, "I very well remember having one when I was a boy, that would accompany me through the fields, catch his game, devour it at his leisure, and, after all, find me out wherever I went; nor, after the first or second adventure of this kind, was I ever afraid of losing him. A peasant, however, to my great mortification, one day shot him, for having made too free with some of his poultry. He was about the size of a wood-pigeon; yet I have seen him fly at a turkey-cock, and when beaten, return to the charge with undaunted intrepidity. I have also known him kill a fowl five or six times as big as himself."

This bird may be trained to hunt partridges and quails. The female builds or takes up with a crow's nest, in hollow trees, rocks, or lofty towers; and generally lays four eggs, red-spotted at the thicker end.

THE OWL TRIBE.

Assiduous in his bower, the wailing owl
Plies his sad song———

THE characters of this genus are, the bill is hooked and covered at the base with bristles; the nostrils are oblong, the head, ears, and eyes very large, and the tongue cleft. Owls, being nocturnal birds, pursue their prey only by night, which is principally small birds and quadrupeds; but they do not reject insects, when they cannot procure more desirable prey. The exuviae and bones of what they devour, are discharged by the mouth, like small pellets; hence their nests often have a quantity of such materials. A gentleman, on grubbing up an old pollard-ash, that had been the habitation of owls for many generations, found at the bottom many bushels of this ejected stuff. Some owls, when they are satisfied, hide the remainder of their meat like dogs.

Destined to seek their food by night, their eyes are so constructed that they see more distinctly in the twilight than in the glare of day. They are capable not only of shutting out or admitting light in common with many other animals, as their necessities require, but they have

also an irradiation in the back part, which materially assists their vision.

Ill adapted either to procure subsistence or to avoid danger in the full blaze of day, they mostly remain concealed in some obscure retreat, suited to their gloomy habits, in solitude and silence, till the shades of night begin to fall. If accidentally dislodged, or tempted by famine to venture abroad by day, they appear dazzled and distracted. The appearance of an owl by day is sufficient to set the whole grove in an uproar. Legions of little birds flock round them, and, taking advantage of their confusion, treat them as objects of contempt and derision. Sensible that he is their natural enemy, and aware of the season of security, they pursue him with unceasing activity, and lend each other courage in the general cause. The black-bird, thrush, bunting, red-breast, sparrow, and even the smallest and most timid birds, unite their feeble powers to insult and abuse the intruder on the realms of day. They utter most discordant notes around him, flap him with their wings, and, like other cowards, pretend to be bold when they know their danger is but small. The owl, unable to see his way, and confounded by the number of his foes, patiently suffers all their indignities with the most sovereign stupidity and indifference.*

All the owl tribe, however, are not equally overpowered by the light of day. The great owl of North America takes considerable flights, and is sometimes seen chasing his prey successfully in the sunshine; but though the generality of owls are incapable of this, nature has compensated for their defect of sight, by a peculiar quickness of hearing, almost unequalled in the feathered race.

The head of the owl is round, somewhat like that of a cat, which animal it strongly resembles in its general modes of life. Its note is either the object of mockery or of terror. The screech-owl alarms the weak and the

* Bird-catchers, taking advantage of this singular propensity, having first limed some of the outer branches of a hedge, hide themselves near the spot, and by imitating the cries of the owl, collect a number of birds together, in hopes of finding their accustomed game; and thus make them an easy prey.



The Horned Owl.



The Owl.

superstitious, and its voice is considered as the presage of calamity or death : while the hootings of the common owl, commonly excite ridicule or contempt.

In winter, owls mostly retire into holes in towers and old walls, and pass that season chiefly in sleep. We have several species in this country.

THE GREAT HORNED OWL.

THE body, which in size equals some of the eagles, is of a tawny red colour, elegantly varied with lines and spots. The wings are long, but the tail is short, and marked with transverse dusky streaks. Legs thick, covered to the very end of the toes with a close and full down of a testaceous colour. Claws great, much hooked, and dusky.

It inhabits inaccessible rocks and desert places, in most parts of Europe, Asia, and America, and preys on hares and feathered game. It has occasionally been shot both in England and Scotland ; and was anciently so common in Greece, that it was considered as the favourite bird of Minerva.

Its appearance in cities was deemed an unlucky omen ; Rome itself once underwent a lustration because one of them strayed into the capitol. The ancients held them in the utmost abhorrence. The Athenians seem to have been free from such popular prejudice, and to have considered owls rather as objects of veneration than abhorrence.

The great horned owl sees better during the day than almost any other of the tribe. The attachment of the female to her young is most extraordinary. A Swedish gentleman having taken a young one, put it up in a large hen-coop, and next morning, before the door of its prison, a dead partridge was found, brought by the dam, which had discovered its abode. This practice continued a fortnight, and every day some bird or animal was brought to support the captive. At length the attentions of the parent ceased, probably because they were not supposed to be longer wanted. Indeed, after a certain period, all birds abandon their young to their own exertions.

THE LONG-EARED OWL.

Save that firm yonder ivy mantl'd tow'r.
The moping owl doth to the moon complain
Of such, as wand'ring near her secret bow'r,
Molest her ancient solitary reign.

THIS bird is distinguished by its six auricular feathers, which rise above an inch in length, variegated with black and yellow, and which it can raise or depress at pleasure.

Hasselquist saw it alive in Cairo, and it is not unfrequent all over Egypt. Its weight, according to Latham, is nine ounces : the length fourteen inches and a half ; the breadth thirty-four ; the irides are of a bright yellow ; the bill black ; the breast and belly are of a dull yellow, marked with slender brown strokes pointing downwards ; the thighs and vent feathers of the same colour, but unspotted. The back and coverts of the wings are varied with deep brown and yellow ; the quill-feathers of the same colour, but the near ends of the outmost is a broad bar of red ; the tail is marked with dusky and reddish bars, but beneath appears ash-coloured ; the feet are feathered down to the claws.

This is a large and solemn looking but very clamorous bird, found in the North of England, and in Wales. It breeds in the caverns of rocks, the hollows of trees, or the turrets of some deserted castle. Its nest, almost three feet in diameter, is composed of the fibrous roots of trees, lined with leaves. The young, which are commonly three in number, are extremely voracious, and the parent is particularly assiduous in supplying their wants.

The short-eared owl is fourteen inches long, three feet broad ; the head is small, and hawk-like ; the bill dusky, weight fourteen ounces, the circle of feathers immediately round the eyes is black, the larger circle white, terminated with tawny and black ; the feathers on the head, back, and coverts of the wings, brown, edged with pale dull yellow, the breast and belly yellow, marked with a few long narrow streaks of brown pointing downwards, the quill-feathers dusky, barred with red, the tail very deep brown, adorned on each side of the shaft of the four middle feathers with a yellow circle

which contains a brown spot, the tip of the tail white. The horns are very small, and each consists of only a single feather, that can be raised or depressed at pleasure, and in a dead bird are with difficulty discovered. This species may be termed the long-winged owl: the wings, when closed, reaching beyond the end of the tail; whereas, in the common kinds, they fall short of it.— This is a bird of passage, and has been observed to visit Lincolnshire in the beginning of October, and to retire early in the spring; so probably, as it performs its migrations with the woodcock, its summer retreat is Norway. During day it lies hid in long old grass; when disturbed, it seldom flies far, but will light, and sit looking around, at which time the horns may be seen very distinctly. It has not been observed to perch on trees like other owls, it usually flies in search of prey in cloudy hazy weather. Farmers are fond of seeing these birds in the fields, as they clear them from mice. It is found frequently in the Orkneys, where it flies about and preys by day like a hawk. It is found also in Lancashire, and in New England and Newfoundland.

THE WHITE OWL.

Near, on a mould'ring antique tow'r,
 The prison of its moping race,
 An owl had chose its murky bow'r,
 And hating day's effulgent light;
 Its joy, the sullen frown of night,
 Its blank domain the silent space!
 There, prompt to spread its shadowy wings,
 Imperious, o'er less daring things;
 Soon as the glow-worm's peaceful state
 Fix'd his dull eyes, in envious hate,
 "Bold worm!" (exclaim'd the tyrant vain,)
 "Thou, who with sparkling light art seen
 "Peering the lonely shades between,
 "How dar'st thou mock my gloomy reign?
 "Thou shalt expire!"

Is almost domesticated; frequenting churches, barns, old houses, and uninhabited buildings, where it rests during the day, and at night issues forth in quest of food. It is extremely useful in destroying mice; a single bird is supposed to be more serviceable than half-a-dozen cats, in clearing barns of vermin.

At the commencement of twilight, it quits its hiding-

place, and takes a regular circuit round the fields, skimming along the ground in search of field-mice. Sometimes, when it has satisfied its appetite, it will, like a dog, hide the remainder of its meat. It appears to have some selection in its choice of food; for though it will strike and kill, it will not taste the shrew-mouse.

The elegance of this bird's plumage sufficiently compensates for its uncouth form. A circle of soft white feathers surrounds the eyes: all the upper parts of the body are of a fine pale yellow, variegated with white spots, and the under parts entirely are white. The legs are feathered down to the very claws. The common length is fourteen inches, and the expansion of the wings three feet. It seldom hoots, but snores and hisses violently, and often, as it flies along, screams most tremendously. It makes no nest, but deposits its eggs, generally five or six in number, in some hole of walls, or under the eaves of old buildings.

During the time the young are in the nest, the male and female alternately sally out in quest of their food, which is only mice; make their circuit, beat the fields with the regularity of a spaniel, and drop instantly on their prey in the grass. They very seldom stay out above five minutes; return with their prey in their claws, but as it is necessary to shift it into their bill, they always alight for that purpose on the roof before they attempt to enter their nest. As the young of these birds keep their nest for a great length of time, and are fed even long after they can fly many hundred of mice will scarcely suffice to supply them with food. It with difficulty bears confinement, even though taken when young.*

THE TAWNY OWL.

THE female of this species weighs nineteen ounces, the length is fifteen inches, the breadth two feet eight

* The Mogul and Kalmuc Tartars almost adore the white owl, for being accidentally the cause of preserving of Jenghis Khan, the founder of their empire. That prince, once defeated, and compelled to seek concealment in a coppice, an owl settled on the bush under which he was lying, and his pursuers thinking it impossible that a bird would perch where a man was concealed, gave up the search, by which means the hero escaped, and recovered his lost fortune.



The Nightingale.



The Owl.

inches, the irides are dusky, the ears in this, as in all owls, very large, and their sense of hearing very exquisite. The colour of this kind is sufficient to distinguish it from every other: that of the back, head, coverts of the wings, and on the scapular feathers, being a fine tawny red, elegantly spotted and powdered with black or dusky spots of various sizes; on the coverts of the wings, and on the scapulars are several large white spots, the coverts of the tail are tawny, and quite free from any marks; the tail is variously blotched, barred, and spotted with pale red and black: in the two middle feathers the red predominates: the breast and belly are yellowish, mixed with white, and marked with narrow black strokes pointing downwards: the legs are covered with feathers down to the toes.—This is a hardy species, and the young will feed on any dead thing, whereas those of the white owl must have a constant supply of fresh food.

THE SCREECH-OWL.

THIS species has an ash-coloured body, the breast and belly are yellowish, marked with white and narrow black strokes pointing downwards. It preys on any kind of flesh, and is sometimes called the ivy-owl.*

GREAT SHRIKE, OR BUTCHER-BIRD.

IN the shrike tribe, sometimes referred to the rapacious order of birds, and sometimes to the pies, the bill is strong, straight at the base, and hooked or bent towards the end; the upper mandible is notched near the tip, the base wants a cere, and the tongue is jagged at the end. The outer toe joins the middle one as far as the first joint. They unite the rapacious birds with the pies, and inhabit every part of the world, in all climates, except within the arctic circle.

The Great Shrike is about ten inches long, and four-

* From its being supposed by the superstitious to presage death its cries are heard with terror and alarm, and indeed it has been frequently noticed to scream near the chamber of the sick, (allured perhaps by the light of the candle or lamp). The ancients likewise believed that it sucked the blood of young children; and Hasselquist says, there is a Syrian owl which frequently enters houses in the evening and destroys infants when asleep.

teen broad. The upper parts of the plumage are of a pale ash-colour; the wings and tail black varied with white, the breast and belly a dull white, and the legs black. The bill black, and about an inch long, is furnished with very thick and strong muscles, by which the bird, with facility, kills its prey. It seizes small birds by the throat, and strangles them; hence it has in Germany the title of the "Suffocating Angel." When its prey is dead, it fixes it on a thorn, and tears it to pieces with its bill. Even when confined in a cage, it will frequently stick its food against the wires before it is devoured.

The butcher-bird, during spring and summer, possesses the faculty of imitating the notes of other birds, thereby decoying them within its reach. At other seasons it retains its natural note, and if caged, though apparently contented, it is always mute. In a word, its instinctive habits are truly wonderful; and, though contemptible in appearance, it is one of the greatest tyrants of the air. It is seldom seen in the cultivated parts of Britain; and inhabits only the mountainous wilds, among furze and unfrequented thickets.

The female builds in trees, and lays six eggs, of a dull olive-green, spotted black at the end. The young when first excluded from the egg, are fed with caterpillars and other insects, but, as they acquire strength, are accustomed to flesh; nor are they driven from the nest when they can provide for themselves, but the parents and the brood form one family, hunting together, and dividing the spoil with great peace and amity.

These birds are supposed to live to five or six years; and there is a strong prejudice in their favour, from an idea that they destroy rats, mice, and other vermin.

The lesser butcher-bird is seven inches and a half long. The irides are hazel; the bill resembles that of the preceding species; the head and lower part of the back are of a fine light grey; across the eyes from the bill runs a broad black stroke; the upper part of the back, and coverts of the wings, are of a bright ferruginous colour; the breast, belly, and sides, are of an elegant blossom colour; the two middle feathers of the tail are longest, and entirely black; the lower part of the others white, and the exterior webs of the outmost fea-

ther on each side wholly so. In the female, the stroke across the eyes is reddish brown; the head a dull rusty grey: the breast, belly, and sides, are of a dirty white, marked with semicircular dusky lines: the tail is deep brown; except each outward feather, whose exterior webs are white. It is rather larger than the male. This bird is more common than the former. It lays six white eggs marked with a rufous brown circle towards the large end. The nest is generally in a hedge or low bush; near which no small bird chooses to build; for it feeds not only on insects, but also on young birds in the nest, holding them by the neck, and strangling them, eating first the brain and eyes. It is fond of grasshoppers and beetles, which it eats by morsels, and, when satisfied, sticks the remainder on a thorn; when kept in a cage, it does the same against the wires, like the former species; it will also feed on sheep's kidneys, eating a whole one every day. It is called in the German language "great head," or "bull head," from the size of that part. Like the cinereous shrike, it only mocks the notes of other birds, having none of its own: and this likewise merely to decoy. In this imitative art it is an adept; if money is counted over at midnight, so as to make a jingling noise, in the place where one of these is kept, it begins to imitate the same sound. When sitting on the nest, the female is soon discovered; for, on the approach of any one, she sets up an horrible outcry.

THE CROW TRIBE.

———But chief the plummy race,
The tenants of the sky, its changes speak.
Retiring from the downs, where all day long
They pick'd their scanty fare, a blackening train
Of clamorous rooks thick urge their weary flight,
And seek the closing shelter of the grove.

THOMSON.

THESE birds are common throughout the world, and are found in almost every climate. They are extremely prolific, clamorous; and some kinds fond of associating in flocks. They build in trees, and produce five or six young at a time. They feed promiscuously on animal or vege able substances, and have been proscribed by

ignorance, from a supposition that they devour much corn; but, if they occasionally consume a little grain, they make ample compensation by destroying immense quantities of insects, which would otherwise prey on human labour, without making the smallest return.

THE RAVEN.

THE raven is black, its back a glossy bluish colour, and its tail nearly rounded. Its length is about eighteen inches, and the expansion of its wings near three feet.

It inhabits most parts of the world, commonly frequenting the vicinity of large towns, where it is serviceable in consuming carrion and filth, which it scents at a great distance. It displays abundant sagacity, by keeping out of the reach of fire-arms; and, among the ancients, it was regarded as a bird of augury.

When taken young, the raven becomes very familiar, and his busy, inquisitive, and impudent disposition, renders him amusing. He will preserve the fruit in a garden from birds and other depredators, either scaring or beating off the former, and by a peculiar note intimating the presence of the latter. He goes where he pleases, affronts and beats off the dogs, plays his tricks on the poultry, and is particularly assiduous in conciliating the good-will of the cook-maid, who is generally his favourite in the family.* But with all his pleasing qualities, he has also these vices and defects, which arise from perverseness indulged. He is a glutton by nature, and a thief by habit. He does not confine his depredatory visits to what he can eat, but he purloins what he can never enjoy; a piece of money, tea-spoon, pen-knife, ring, pencil, or any other trinket, tempts his avarice; he carries it to his hole, and seems to exult in the exploit.†

* The author has one, which regularly attends under the window during the meal times; and, by his calls, attracts attention to his wants; no stranger dare pass him unless with a wand. And many times has he succeeded in taking trifles out of the hands of the pupils, when they least expected any such visitation.

† A gentleman's butler having missed several silver spoons, became very uneasy; but, at last, detected a lame raven carrying one to his hiding-place, and therein upwards of a dozen more were discovered.

A popular respect is paid to the raven, in all countries; probably originating from its being appointed by Heaven to feed the prophet Elijah. This prepossession is very ancient, as the Romans, from a principle of superstitious fear, treated it with profound veneration; and, in our day, the Swedes never molest it. Pliny mentions a raven which had been kept in the temple of Castor, flew down into the shop of a taylor, who, pleased with his visitor, taught him several tricks, particularly to pronounce the names of Tiberius and the whole royal family. The taylor was beginning to grow rich by the concourse of visitors to see his bird: when a neighbour, envious of his prosperity, slew the raven, and deprived him of all hopes of farther improving his fortune. The Romans, however, punished the offender, and honoured the bird with a magnificent funeral.

Ravens generally fly in pairs. The female builds in trees, and in the holes of rocks, and lays five or six bluish-green eggs, spotted with brown. She sits about twenty days with the utmost perseverance, and the male supplies her with food, and nothing can urge her to quit her station.*

The raven will eat any kind of offal; but when that is scarce, destroys rabbits, ducklings, and chickens. He will sometimes eat the eggs of other birds; and his flesh, though rank and nauseous, is eaten by the natives of Greenland.

THE CARRION CROW

Is less than the raven, but in colour, form, and many of its habits, closely resembles it, living in pairs, feeding upon putrid flesh, and frequently committing depredations without any ostensible object. It will even pick out the eyes of lambs when fresh dropt; and is peculiarly destructive in a rabbit-warren. In a domestic state, it is capable of being taught to articulate several words with considerable distinctness.

The female builds her nest on trees, and lays five or

* White mentions a raven which continued on her nest till the tree was felled to the ground, when the poor bird became a martyr to parental affection.

six eggs, sitting with the same perseverance as the raven, and, like her, being fed by the male.

The carrion crow has been seen to strike a pigeon dead from the top of a barn. It is so bold, that not the kite, buzzard, or raven dare approach its nest; and to maintain its young it will attack birds of powers superior to its own.

Formerly crows were so numerous in this country, that an act of parliament was passed for their destruction.*

THE ROOK.

AMONG the various notes of animated nature, few are more soothing to the mind or more pleasing to the imagination, than the cawing of rooks. Though the voice of a single rook merits little praise; yet, when he sings in concert, which is his chief delight, an harmonious whole is produced, and we listen with pleasure to the chorus.

This species is about the size of the carrion crow, but its plumage is a more glossy black, and the forepart of the head somewhat ash-coloured; and is further distinguished from the crow by its social habits, and its modes of living.

Rooks subsist chiefly on worms, insects, and grubs, and are very useful assistants to human industry. They indeed devour corn, and other kinds of grain, when they experience a scarcity of their favourite food, and hence are proscribed by selfish ignorance; but, without them, the harvests would frequently fail, (as has been proved in Suffolk and some parts of Norfolk), where the grub of the cock-chaffer destroys the roots of corn and grass to such a degree, that half a crop would not be produced, but for the instinctive diligence of these birds.†

* Dr. Darwin says, he once saw, on the coast of Ireland, a flock of crows preying on muscles, which they raised a considerable height in the air, and then dropping them on the stones, broke the shell and devoured the animal.—It is related, that a certain ancient philosopher, walking along the sea-shore to gather shells, this bird mistaking the bald head of the sage for a stone, dropped an oyster upon it, and at once killed its prey and the man.

† Rooks are very destructive of corn, especially of wheat. They search out the lands where it is sown, and watching more carefully

In England, rooks remain during the whole year, but in France and Silesia they migrate; and it is very singular that none are found in Jersey.

With us the flocks sometimes assembled, darken the air in their flight. They build their nests on high trees, close to each other, and when they have once formed a colony, they frequent the same place, repair their old nests in the spring, and seldom suffer intruders within the limits of their domain. Yet, though natu-

than the owners, perceive when the seed first begins to shoot up its blade; this is their time of feeding on it. They will not search for it at random in the sown land, that being more trouble than so small a grain will requite them for; but these blades appear to direct them, without loss of time or pains, to the places where the grains lie; and in three or four days time they will root up such vast quantities, that a good crop is often thus destroyed in embryo. After a few days the wheat continuing to grow, its blades appear green above-ground; and then the time of danger is over, the seeds being so far robbed of their mealy matter, that they are of no value to that bird, and it will no longer give itself the trouble to destroy them.

Wheat sown so early as to shoot up its green blades before the harvest is all carried in, is in no danger from these birds; because, while in a state worth searching for, the scattered corn in the harvest fields is easier come at, and they feed wholly thereon, neglecting the sown grain. But, as this cannot always be done, the farmers, to drive away these ravenous and mischievous birds, dig holes in the ground and stick up the feathers of rooks in them, or hang up dead rooks on sticks in several parts of the fields; but all this is of very little use, for the living rooks will tear up the ground about the feathers, and under the dead ones, to steal the seeds. A much better way is to tear several rooks to pieces, and scatter them over the fields; but this lasts only a little while, for kites and other birds of prey soon carry off the pieces for food. A gun is a good remedy while the person who has it is present; but as soon as he is gone, they will return to the field with redoubled vigour, and tear up every thing before them.

The best remedy is to watch well while the corn is in the condition stated; and, as this is only a few days, a boy might be paid to watch the field from day-break till the dusk of the evening. Every time they settle on the ground, or fly over it, the boy is to holloa, and throw a dead rook up into the air; which will always make them rise; and they will become so tired of this disturbance that they will seek out other places of prey, and leave the ground even before the corn is unfit for them. They rise at the tossing up of their dead fellow-creature, because, being extremely apprehensive of danger, they are always alarmed when one of their comrades rises. They take this for the rising of an out-bird, and all fly off at the signal.

rally gregarious, they are often bad neighbours; as, to finish their own nests with the least possible trouble, they frequently plunder the sticks that compose another's.

As soon as the nest is completed, the male begins to feed the female, and this gallant deportment is continued during the whole season of incubation.*

When the first brood of rooks are sufficiently fledged, they quit their nest-trees during the day, in search of food, but return every evening to sleep. Indeed, it is very delightful to see these birds congregating before dusk, also the various evolutions performed in their return; and to hear their united notes, poured out as if forming the evening service of gratitude to the Universal Almighty Parent.

THE JACKDAW

Is a lively, loquacious bird, possessing great sagacity, and capable of very strong attachment. It is of a brownish black colour, the hind part of the head hoary, the front, wings, and tail black. It is very common in this country, where it remains the whole year; but, in some parts of the continent, it is migratory.

This bird frequents old towers and ruins, where it builds its nest and rears its young. Sometimes it has been known to build in hollow trees near a rookery, and to join the rooks in their foraging expeditions. In Hampshire, where are few towers, or steeples, they have been known to occupy rabbit holes; and, indeed, seem acquainted with the art of availing themselves of local circumstances, in every situation.

* Astonishing conflicts take place sometimes between rooks themselves, and between them and other birds. A few years ago, a remarkable contest happened at Dalham Tower, in Westmoreland, between a colony of herons and another of rooks, which built in two adjacent groves; peace and harmony had long prevailed, but the grove occupied by the herons being cut down, they claimed the right to share the remaining one possessed by the rooks, and accordingly, for two seasons, a war was carried on between them: the one to establish their supposed right, the other to repel invasion; many lives were lost on both sides, but at last the herons were victorious. On this, a peace seems to have been concluded between them, as the two communities live together in harmony, each confining itself to a particular portion of the grove,

They feed principally on worms and grubs, but will not refuse grain or flesh. They have a native propensity to hide what they cannot eat; and they carry away pieces of money or toys, sometimes causing suspicion against the innocent. They are tamed with great facility, and prove very entertaining. With little instruction, they may be taught to pronounce distinctly several words, and even sentences.*

This bird does mischief to the farmer and gardener; and is such a thief that he will carry away much more than he can use. A method of destroying them by a kind of springe, is so proper, that it ought to be well-known. A stake, about five feet long, is driven firmly into the ground, and the point made so sharp that the bird cannot settle upon it; within a foot of the top an inch hole is bored, through which is put a stick, about eight inches long; then a horse-hair springe is made fast to a thin hazel-wand, and brought up to the short stick, and carried with it through the hole, the remainder being left open under that stick. The other end of the hazel-rod is fastened through a hole near the ground. The stake being planted among the jackdaw's food, he is naturally led to settle on it; but finding the point too sharp, he descends to the little cross-stick, which will sink with his weight, the springe will receive his leg, and hold him fast.

THE JAY.

Is one of the most beautiful birds in our woods. Its back and breast are a delicate cinnamon colour, the coverts of its wings blue, barred with black and white, and on the forehead it can erect at pleasure a beautiful tuft of white feathers streaked with black; yet, notwithstanding its external elegance, its note is harsh, grating, and unpleasant.

* The writer had a favourite jackdaw, that regularly attended at the window, as soon as breakfast or dinner was brought in, to receive his allowance; and at every opportunity would enter the room and hop about familiarly. He had been taught to cry "halt! dress! eyes right!" and "poor jack!" and as he often perched near the public-road, some laughable incidents arose from his proneness to repeat what he had learned; he was, however, unfortunately drowned in a bath into which he had ventured to wash himself, and there was scarcely a dry eye in the family on witnessing "poor jack's" catastrophe.

The jay feeds on acorns, nuts, and all kinds of fruit, even those cultivated in gardens, where it is an unwelcome intruder. It builds an artless nest in trees, in which it lays five or six eggs. The young continue with the parent birds till next pairing time, when each chooses his mate, and separates to form a new colony.*

THE MAGPIE

Is a well-known elegant bird, variegated with black and white, and with a wedge-shaped tail. Like the crow, it feeds on most kinds of vegetable or animal substances. It builds its nest with great art, covering it entirely with thorns, except a small hole for admittance, and lays six or seven eggs. It is a mischievous bird in farm-yards and rabbit-warrens; and, like all its tribe, is addicted to stealing; and, when satiated, will frequently hoard up its provisions.

In a tame state it is a familiar bird, and will learn to pronounce not only words, but short sentences, and imitate any particular noise it is accustomed to hear. Plutarch mentions a magpie, belonging to a barber at Rome, which was such an adept in the imitative art, that it got through all the repetitions, stops, and changes of the trumpet.†

THE CORNISH CHOUGH

SOMETIMES called the *red-legged Crow*, is blackish, mixed with a violet colour, and its bill and feet are red. It frequents mountainous and rocky situations, and builds its nest in high cliffs, or ruined towers, laying four or five eggs. It is found in some places in Cornwall and North Wales, inhabiting the cliffs and ruinous castles.

* The jay domesticated will be very familiar, and catch and repeat many sounds. One has been heard to imitate so exactly the noise made by the action of a saw, as to induce strangers to suppose a carpenter was at work. Another, in the north of England, had learned, at the approach of cattle, to set a cur dog on them, by whistling and calling him by name. But an accident happening to a cow, in consequence of this propensity, the poor jay was complained of as a nuisance, and dispatched accordingly.

† In Norway, its appearance being uncommon, it is esteemed ominous; and, indeed, in various parts of England, the vulgar have similar prejudices: a single magpie is thought a sign of ill-luck; two, of good fortune; three, of a funeral; and four, of a wedding.



The Cuckoo.



The Falcon.



along the shore. A few are found on Dover Cliff, where a pair sent from Cornwall escaped, and have since stocked the spot, but do not appear much attached to it.

This is an elegant and tender bird, and unable to endure severe weather. Its disposition is active, restless, and meddling; charmed with glittering objects, and very apt to snatch up bits of lighted sticks, by which houses have sometimes been set on fire. It commonly flies very high, and makes a shrill noise. In Cornwall, it is not unfrequent to see them running about the gardens of the peasantry, in the most tame and familiar manner. They shew great attachment to their protectors, but will not allow a stranger to touch them.

THE CUCKOO.

THIS singular bird, familiar in most countries, has obtained a name in all languages, from the sound of its voice. In Europe it is a bird of passage, or at least it disappears early in the summer, and is seldom seen or heard till the middle of April.

The cuckoo is an elegant bird, in both form and colours; it is blackish, in general spotted with white, and the tail is rounded; but its natural history most interests us. Vulgar credulity ascribes to it numerous qualities, certainly not belonging to it, although some of its habits are sufficiently extraordinary.

It is now ascertained that this bird seldom builds a nest of her own, but deposits her solitary egg in that of some other bird, by which it is hatched; generally selecting the hedge-sparrow, water-wag-tail, tit-lark, yellow hammer, or whinchat; but ever preferring the first.

Dr. Jenner, (who has so distinguished himself by introducing vaccine inoculation,) some years ago threw much new light on the œconomy of this singular bird. He observes, that while the hedge-sparrow is laying her eggs the cuckoo contrives to deposit her egg among the number, leaving it to the care of the foster-mother. When the period of incubation is past, and the young are excluded, the hedge-sparrows are soon turned out by the spurious progeny, and then the young cuckoo becomes her sole charge.

Sometimes the eggs of two cuckoos are deposited in

the same nest, and then a violent contest arises which shall retain possession; for it seems a natural instinct that only one bird shall remain in the nest; and though the cuckoo can easily manage to turn out young hedge-sparrows, or other small birds, it must try its strength before it can dislodge one of its own species.

Instances, however, have been recorded of the cuckoo building a nest, and rearing her own young: and, perhaps, both modes may be occasionally practised.

Before the cuckoo retires, it becomes mute, and its place of retreat has been as much disputed as its manner of being bred. The prevalent opinion is, that it emigrates, while some maintain that it lies torpid in hollow trees during the winter. Willoughby supports this, by mentioning that some old willows being put into an oven to heat it, the people were astonished with the sound of "cuckoo, cuckoo!" issuing from the place. On examination a cuckoo was found, awakened by the heat of the oven, and the bird was kept alive for two years afterwards.

The young cuckoo may, with care, be brought up pretty tame, and rendered familiar. It is then fed with bread, milk, eggs, fruits, insects, or meat; but, in a state of nature, is supposed to live chiefly on caterpillars.

The subsequent extract from Logan's beautiful Ode to the Cuckoo, admirably describe some parts of its natural history.

Hail beauteous stranger of the grove!
 Thou messenger of spring!
 Now Heaven repairs thy rural seat,
 And woods thy welcome ring.
 What time the daisy decks the green,
 Thy certain voice we hear;
 Hast thou a star to guide thy path,
 Or mark the rolling year?
 Delightful visitant! with thee
 I hail the time of flowers;
 And hear the sound of music sweet,
 From birds among the bowers.
 What time the pea puts on the bloom,
 Thou fliest thy vocal vail;
 An annual guest in other lands,
 Another spring to hail.
 Sweet bird! thy bower is ever green,
 Thy sky is ever clear;
 Thou hast no sorrow in thy song,
 No winter in thy year.

THE COMMON WOOD-PECKER.

THE singular race of birds called wood-peckers live chiefly on insects, which they pick out of the bark and inner parts of trees, by means of a long barbed bony tongue, furnished with a curious muscular apparatus for projecting it with great force ; they are altogether an innoxious tribe.

The common wood-pecker is, perhaps, one of the most beautiful birds in our sylvan scenes. Its prevailing colours are greenish on the body, but the crown of the head is crimson. Its length is about thirteen inches, and the expansion of the wings twenty-one ; the bill is dusky, triangular, and near two inches long ; the crown of the head is crimson, spotted with black ; the eyes are surrounded with black, and the males have a rich crimson mark beneath the blackness ; the back, neck, and lesser coverts of the wings, are green ; the rump of a very pale yellow ; the whole of the under part of the body is of a very pale green, and the thighs and vent are marked with dusky lines ; the legs and feet are of a cinereous green ; the tail-feathers are generally broken, as the bird rests on them in climbing ; their tips are black ; the rest of each is alternately barred with dusky and deep green ; their principal action is climbing the bodies or boughs of trees. To force their way to the cavities of trees, their bills are strong, very hard, and the end wedge-like, a neat ridge runs along the top, adding to its strength and beauty : with its bill it makes holes as regular as if bored with an auger, or traced with compasses. But this has obtained the appellation of the rain-fowl, from its particular note before a change of weather. Yet, as it has not power to penetrate a sound tree, the perforation of any tree is a warning to the owner to cut it down. Their legs are short, but strong, thighs very muscular, toes disposed two backward two forward, the ten feathers of the tail hard, very stiff, sharp-pointed, and bending downwards. These circumstances admirably enable them to run up and down the sides of trees with great celerity ; and the strong tail supports them firmly when they continue long in one place, either where they find plenty of food, or while forming an access to the interior part of the timber. This form of

the tail makes their flight very awkward, as it inclines their body down, and forces them to fly with short and frequent jerks when they would ascend or even keep in a line. This species make their nests in the hollows of trees; and lay five or six eggs, of a beautiful semi-transparent white.

The male and female by turns bore till they come to the rotten part of the wood, where, hollowing out to a proper depth, they lay their eggs. The young ones climb up and down the trees before they can fly. They are said to be fond of bees in winter, making great havoc among them.

THE GREAT SPOTTED WOOD-PECKER

WEIGHS near three ounces, the length nine inches, the breadth sixteen, the bill an inch and a quarter, of a black horn colour, the irides red, the forehead a pale buff, the crown of the head a glossy black, on the hind-part a rich deep-crimson spot, the cheeks white, bounded beneath by a black line from the corner of the mouth round the hind-part of the head, the neck encircled with black, the throat and breast yellowish white, the vent feathers of a fine light crimson. The back, rump, and coverts of the tail, and lesser coverts of the wings, are black, the legs are of a lead colour. The female wants that beautiful crimson spot on the head, in other respects both agree; this species, less common than the preceding, keeps in the woods, in England, France, Germany, and other parts of Europe; and is likewise met with in America. It is a very cunning bird, when a person has seen one on a tree, he almost certainly loses sight of it, if the tree is large, and he not very attentive; for the moment it spies any one, it creeps behind a branch, and there lies secure till the danger is over. The extreme facility with which birds of the woodpecker kind descend and ascend trees, is very admirable, seeming to do both with equal ease to itself. No one has, as yet, noticed the colour of the eggs; but Buffon mentions having found a nest with six young ones in an old decayed asp tree, thirty feet from the ground.

THE NUTHATCH,

IN its general habits, nearly corresponds with the wood-pecker; nor is its formation very different, except in having three toes placed forward, and only one backward. The only species known in this country, and indeed in Europe, shows a predilection for nuts; hence its English name. This bird is about six inches long, and the extent of its wings nine inches, the bill is strong and straight, about three-quarters of an inch long; the upper mandible black, the lower white: the irides are hazel, the crown of the head, back, and coverts of the wings, of a fine blueish grey, a black stroke passes over the eye from the mouth, the cheeks and chin are white, the breast and belly of a dull orange-colour. It is shy and solitary, frequents woods, and amuses itself by running up and down trees. It feeds on caterpillars, beetles, and other insects, as well as on nuts. It is a pretty sight, (says Mr. Willoughby) to see her fetch a nut out of her hoard, place it fast in a chink, as in a vice, and then, standing above it, with its head downwards, striking it with all its force, break the shell, and catch up the kernel. While at work it makes a rasping noise, that may be heard at a considerable distance; and sometimes by inserting its bill into a crack in the bough of a tree, it will produce a sound as loud as if the wood was rending asunder. It utters its note in the night, and at the approach of winter draws near to houses and gardens. It is supposed not to sleep perched on a twig like other birds; for, when confined in a cage, it prefers sleeping in a hole or corner. When at rest it keeps the head down. In autumn it begins to make a chattering noise, being silent for the greatest part of the year.

The female is like the male, but less in size, and weighs commonly five or six drams. The eggs are six or seven in number, of a dirty white, dotted with rufous, these are deposited in some hole of a tree, (frequently one deserted by a wood-pecker,) on the rotten wood mixed with a little moss, &c. If the entrance be too large, the bird nicely stops up part with clay, leaving only a small hole to pass in and out. While sitting, if any one puts a bit of stick into the hole she hisses like a snake, and is so attached to her eggs, that she will soon-

er suffer any one to pluck off her feathers than fly away. During the time of incubation, the male, with all the tenderness of an affectionate mate, supplies her with sustenance.

THE KINGSFISHER. (*Alcedo*).

OF this beautiful genus of birds we have only one species in Britain, the common kingfisher, which frequents the banks of rivers and small streams, preying principally upon fish, which it catches with great dexterity; sitting patiently on a branch projecting over the current, till its game appears. The top of the head and the sides of the body are of a dark green, marked with transverse spots of blue; the tail is a deep blue, and the other parts of the body are dusky orange, white, and black. In short, such an assemblage of gaudy colours is not united in any other bird, and its form is sufficiently elegant to set off its plumage. The bill is long and triangular, and the toes are formed for climbing.

The kingfisher is frequently seen balancing itself over the water for a considerable time, then darting below the surface, and bringing up its prey in its feet, which it swallows whole, and afterwards disgorges the indigestible parts. While suspended in the air, in a bright day, its plumage exhibits a very beautiful variety of most dazzling and brilliant colours. It makes its nest in the banks of rivers, which it scoops to the depth of three feet, and lays from five to nine eggs. The nest has a very foetid smell, occasioned by the remains of fish brought to feed its young.*

* The kingfisher is found in most parts of Siberia; and the Tartars and Asiatics employ its feathers for many superstitious purposes. Even in this country the vulgar entertain a belief, that when the body of this bird is suspended by a thread, its breast, by some magnetic influence, will always be turned to the north. It is also thought that its skin stuffed will preserve woollen clothes from the moth. In all ages some superstition seems to have been attached to the kingfisher, and the marvellous has been plentifully mixed with its history. The ancients believed that it possessed the property of calming the waves of the sea, and that it built its nest on the foam. Hence a period of happiness and ease is still called *halcyon days*.

It is an opinion generally received among the modern vulgar, that the flesh of the kingfisher will not corrupt, and will even

NATURE DISPLAYED.



THE HOPOE.

THE HOOPOE.

THIS bird, which is only an occasional or periodical visitant of Britain, is easily distinguished by a beautiful though enormous tuft of variegated feathers on the crown of its head, which it can raise or depress at pleasure. The back and wings are crossed with broad bars of white and black, the neck is a pale reddish brown, and the breast and belly are white.

The beak is arcuated, convex, and something blunt; the tongue is obtuse, triangular, entire, and very short, and the feet are fitted for walking. It is in length fifteen inches, the bill is black, two inches and a half long, slender, and incurvated; the irides are hazel, the crest consists of a double row of feathers, the highest about two inches long, the tips are black, their lower part of a pale orange-colour, the neck is of a pale reddish brown, the breast and belly white, the lesser coverts of the wings are of a light brown, the back, scapulars, and wings, crossed with broad bars of white and black, the rump is white; the tail consists of only ten feathers, white marked with black, in form of a crescent, the horns pointing towards the end of the feathers. The legs are short and black; the exterior toe is closely united at the bottom to the middle toe.

The hoopoe is a native of Europe, Asia, and Africa. It feeds on beetles and other insects, and makes its nest of dung, in the hollow of trees, laying two ash-coloured eggs. Disgusting as it may appear from its habits, it is eaten in some parts of Italy. Its note is expressive of its generic name, or it may be derived from the French *huppe*, or crested, and in Sweden its appearance is deemed portentous of war, and even in this country it is considered as the precursor of some calamity. Dr. Pallas affirms, that it breeds in preference in putrid carcases; and that he had seen the nest of one in the privy of an uninhabited house, in the suburbs of Tzaritsyn. Ovid says that Terens was changed into this bird.

banish all vermin. This has no better foundation than that of its breast always pointing to the north. The only truth which can be affirmed of this bird, when killed, is, that its flesh is utterly unfit to be eaten; while its beautiful plumage preserves its lustre longer than that of any other kind of bird we know.

The hoopoe is a bird of passage through all Europe, except the mild climates of Greece and Italy; and it is seen among those vast crowds of migratory birds, which, twice every year, pass the island of Malta. Hoopoes seldom perch on trees, or remain long on the wing, but hunt after their prey on the ground.

THE CREEPER.*

BIRDS of this genus are spread over the globe, though in Britain we have only one species. It is the least of our feathered tribes, except the crested wren; weighing about five grains, though its manner of ruffling its feathers makes it appear beyond its real size. Its colours are a mixed grey, with the under parts of the body white: the tail is long, and consists of twelve stiff feathers: and from its feet being well adapted for creeping up and down the stems of trees in search of its insect food, it receives its name. It breeds in hollow trees, and sometimes lays twenty eggs.

LECTURE LXVI.

THE POULTRY TRIBE.

MOST, if not all, birds of the poultry kind domesticated in our yards, are of foreign extraction; but others are ranked in this class, as yet in a state of nature, and perhaps only wait till they become sufficiently scarce to be taken under the care of man to multiply their propa-

* This little creature seems to have a particular attachment to human society; and in some parts of the world receives an interested protection, from its destroying insects in its vicinity. In many districts of the United States of America, a small box is fixed at the end of a long pole, in gardens and about houses, for the creeper to breed in. There the female builds her nest, and rears her young, for whose support she consumes an immense quantity of insects. A gentleman, who watched the motions of these birds, observed that the parents generally went from the nest and returned with their prey, from forty to sixty times in an hour, and that they were engaged in this business the greatest part of the day. Allowing then that only twelve hours were thus occupied, a pair of creepers would destroy upwards of six hundred insects in a day, on the supposition that they only took a single one each time.

gation. It is remarkable, how much the tame poultry imported from distant climates has increased, and how much those wild birds of the poultry kind, not yet taken into keeping, have been diminished and destroyed. They are all thinned, and many of the species, especially in the more cultivated and populous parts of the kingdom, are rarely seen.

Birds of the poultry kind include all that have white flesh, and bulky bodies, compared with their heads and limbs. They are furnished with short strong bills for picking up grain, which is their chief and often their only sustenance. Their wings are short and concave; hence they cannot fly far. They lay many eggs; and, as they lead abroad their young the very day they are hatched, in quest of food, which they are shown by the mother, and which they pick up for themselves, they generally make their nests on the ground. The toes of all these are united by a membrane to the first articulation, and are then divided.

Under this class, therefore, come the common cock, peacock, turkey, pintada, or Guinea-hen, pheasant, bustard, grouse, partridge, and quail. They all have a strong similitude, being granivorous, fleshy, and delicate to the palate. They are among birds what beasts of pasture are among quadrupeds,—peaceable tenants of the field, and shun the thicker parts of the forest, that abound with numerous animals, who carry on unceasing hostilities against them.

Nature has formed the rapacious class for war, and seems equally to have fitted these for peace, rest, and society. Their wings being short, they are ill-formed for wandering from one region to another; their bills are also short, and incapable of annoying their opposers; their legs are indeed strong, but their toes are made for scratching up their food, and not for holding or tearing it.—These are sufficient indications of their harmless nature; while their bodies, which are fat and fleshy, render them unwieldy travellers, and incapable of straying far from each other. Accordingly, we find them chiefly in society: they live together, and though they may occasionally have their disputes, like all other animals, yet, when kept in the same district, or fed in the same yard, they learn the arts of subordination; and in

proportion as each knows his strength, he seldom tries a second time the combat where he has once been worsted.

Thus, all of this kind seem to lead an indolent voluptuous life. Furnished internally with a very strong stomach or gizzard, their voraciousness scarce knows any bounds. If kept close, separated from all their companions, they have still the pleasure of eating left; and they soon grow fat and unwieldy in their prison. To say this more simply, many of the wild species of birds, when cooped or caged, pine away, grow gloomy, and refuse all sustenance whatever; none grow fat, except those of the poultry kind, who seem to lose all remembrance of their former liberty, satisfied with indolence and plenty.

THE DOMESTIC COCK.

———— The careful hen
Calls all her chirping family around,
Fed and defended by the fearless cock;
Whose breast with ardour flames, as on he walks,
Graceful, and crows defiance.

THOMSON.

THE cock, "the messenger of morn," is too well known to require much description. Of all other birds, perhaps, this species affords the greatest number of varieties; there being scarce two to be found that exactly resemble each other in plumage and form. The tail, which makes such a beautiful figure in the generality of these birds, is yet found entirely wanting in others, and not only the tail but the rump also. The toes, which are usually four in all animals of the poultry kind, yet in a species of the cock are found to amount to five. The feathers, which lie so sleek and in such beautiful order in most of those we are acquainted with, are in a peculiar breed all inverted, and stand staring the wrong way. Nay, there is a species from Japan, which, instead of feathers, seems to be covered with hair.

The cock has been so long domesticated that it is impossible to say when he was introduced into Europe, though it is admitted that he came from the East, where the primitive stock is still found enjoying its native independence. This animal was in fact known so early, even in the most savage parts of Europe, that we are told the cock was one of the forbidden foods among the ancient Britons. The domestic fowl seems to have ba-

nished the wild one. In this wild condition his plumage is black and yellow, and his comb and wattles yellow and purple. There is another peculiarity also in those of the Indian woods; their bones, when boiled, are as black as ebony.

In their first propagation in Europe, there were distinctions then that now subsist no longer. The ancients esteemed those fowls whose plumage was reddish as invaluable; but as for the white, it was considered as utterly unfit for domestic purposes. That which we call the game-cock is not so fruitful as the dunghill-cock, which we treat with contempt. The Athenians had their cock-matches as well as we, but probably they did not enter into our refinement of choosing out the most barren of the species for the purposes of combat.

The beauty of his plumage, his undaunted spirit, as well as the various wants of mankind which he assists to supply, have rendered the cock a favourite in every country. His courage is almost invincible, and with a gallantry, not to be surpassed, he will lay down his life in defence of his hens, which he leads, protects, and cherishes, collects them when they straggle, and he seems to feed unwillingly till they participate in the spoil. An intruder is always attacked with resolution. The cock can neither bear a rival nor an opponent.*

The native bravery of the cock, indeed, has frequently been perverted to his own destruction, and to the disgrace of the human race.† The Sumatran, and

* On some occasions, the cock has manifested a kind of jealousy, and shown himself actuated by revenge. The eggs of a partridge being put under a fine hen, a great favourite of the cock, she brought up the suppositions brood with abundant care, shut up in an out-house, and inaccessible to the other poultry. At last the door of her retreat happening to be left open, the cock got in, and finding her surrounded with a bastard race, fell upon her with the utmost fury and killed her.

† Will it be believed in future ages, that Christians, men of enlightened mind, and of high rank in society, should delight to see these animals tear each other to pieces? Even Pagans might blush at such inhumanity. The Battle Royal and the Welch Main need only be named to be execrated. In the former, they pit an unlimited number of cocks, of which only the last surviving bird is accounted the victor, so that of sixteen couple, thirty-one must be sacrificed before the combat is decided.

some other Oriental nations, almost rival the infamy of the English in this barbarous pastime; but, probably, the reader will allow them excuses which will not avail us. In some parts of the East, indeed, they fight cocks for not only money, but their wives, sons, daughters, sisters, and mothers. In disputed points of this deep play, four arbitrators are chosen, and if they cannot agree, the only alternative is for the parties concerned to fight it out in person. Our cock-fighters seldom have any desire to risk their own lives: the cruel are commonly cowards.

The cock claps his wings before he sings or crows. His sight is very piercing; and he never fails to raise a peculiar cry when he discovers any bird of prey in the air. His extraordinary courage is thought to proceed from his being the most salacious of all birds. A single cock suffices for ten or a dozen hens: and he is the only animal whose spirits are not abated by indulgence. But then he soon grows old; the radical moisture is exhausted; and in three or four years he becomes utterly useless. Hens also, as they daily lay eggs the greatest part of the year, cannot suffice for so many births, but mostly, after three years, become barren; for, when they have exhausted all their seed-eggs, of which they had but a certain quantity from the beginning, they must necessarily cease to lay, there being no new ones generated.

The eggs of the hen, which, with proper feeding, she lays at almost every season of the year, are nutritious and pleasant food. The hen seldom clutches two broods of chickens in a season, though such instances have been known. A domestic hen will lay in the year above two hundred eggs, if she be well fed and at liberty. It matters little whether she be with the cock or not she will lay, though these eggs never by hatching produce a living animal. Her nest is made with little care; a hole scratched in the ground, among a few bushes, answers for this season of patient expectation. Nature, almost exhausted by fecundity, seems to inform her of the proper time for hatching, which she testifies by a clucking note, and by discontinuing to lay.*

* Good housewives, who often get more by their hens laying than by their chickens, often artificially protract this clucking, and

Left entirely to herself, the hen seldom lays above twenty eggs in the same nest, without attempting to hatch them: but as she lays, her eggs being removed, she continues laying, vainly hoping to increase the number. In the wild state, she seldom lays above fifteen eggs; but then her provision is with more difficulty obtained, and she seems aware of the difficulty of maintaining a numerous family.

When the hen begins to sit, nothing can exceed her perseverance and patience; she continues for some days immoveable, and when forced away by the importunities of hunger, she quickly returns. Sometimes her eggs become too hot for her to bear, especially if in a warm nest within doors, and then she leaves them to cool a little; thus a warm nest only retards incubation, and often puts the brood a day or two back in the shell. While the hen sits, she carefully turns her eggs, and even removes them to different situations; till at length, in about three weeks, the young brood give signs of a desire to burst their confinement. When, by the repeated efforts of their bill, which serves like a pioneer on this occasion, they have broke themselves a passage through the shell, the hen still continues to sit till all are excluded. The strongest and best chickens generally are the first candidates for liberty: the weakest come behind, and some die in the shell. When all are produced, she leads them forth to provide for themselves. Her affection and pride seem then to alter her nature, and correct her imperfections. No longer voracious or cowardly, she abstains from all food that her young can swallow, and boldly flies at every creature she thinks likely to do them mischief. Whatever the invading animal be, she boldly attacks him; the horse, hog, or mastiff. When marching at the head of her little troop, she acts the commander, and has a variety of notes to call her numerous train to their food, or to warn them of approaching danger.*

sometimes entirely remove it: when a hen begins to cluck, they lessen her provisions, and then plunge her into cold water; this effectually puts back her hatching, but it often kills the poor bird, who takes cold and dies under the operation.

* Upon such an occasion a whole brood have been seen to run for security into the thickest part of an hedge, while the hen herself ventured boldly forth, and faced a fox which came for plunder.

Various artificial schemes have been invented for hatching eggs, without the assistance of the hen ; and in Egypt they are peculiarly successful, by heated ovens, in which it has been computed that a hundred millions of chickens are annually produced. The practice has been introduced into France, and has likewise been attempted in Britain ; but the trouble and expence have been found to exceed the profit.

THE COMMON PHEASANT.

See ! from the brake the whirring pheasant springs,
 And mounts exulting on triumphant wings :
 Short is his joy ! he feels the fiery wound,
 Flutters in blood, and panting beats the ground,
 Ah ! what avail his glossy varying dyes,
 His purple crest, and scarlet circled eyes ;
 The vivid green his shining plumes unfold ;
 His painted wings, and breast that shines with gold.

POPE.

THIS very beautiful bird, which has long been partially reclaimed, but seems incapable of being absolutely domesticated, is found wild over all the old continent. Except the peacock, the pheasant has the most elegantly variegated plumage of any of the gallinaceous tribes ; and the male is much more splendid in its colour than the female. These birds, though so beautiful to the eye, are not less delicate when served up to the table. Their flesh is considered as the greatest dainty ; and the old physicians, speaking of the wholesomeness of any viands, compared them with the flesh of the pheasant. Yet, notwithstanding these perfections to tempt the curiosity or the palate, the pheasant has multiplied in its wild state.

A spirit of independence seems to attend the pheasant even in captivity. In the woods, the hen-pheasant lays from eighteen to twenty eggs in a season ; but domesticated she seldom lays above ten. When wild, she hatches and leads up her brood with patience, vigilance, and courage ; but when tame, never sits well, (so that a hen is generally her substitute), and as for leading her young to their food, she is utterly ignorant where it is to be found ; and the young birds starve, if left solely to her protection. The pheasant, therefore, seems better left at large in the woods, than reclaimed to pris-

tine captivity. Its fecundity, when wild, is sufficient to stock the forest; its beautiful plumage adorns it; and its flesh retains a higher flavour from its unlimited freedom.

However, it has been the aim of late to take these birds once more from the woods, and keep them in places fitted for their reception. Like all others of the poultry kind, they have no great sagacity, and suffer themselves easily to be taken. At night they roost upon the highest trees of the wood; and by day come down into the lower brakes and bushes, where their food is chiefly found. They generally make a kind of flapping noise when they are with the females; and this often apprises the sportsman of their retreats. At other times he traces them in the snow, and frequently takes them in springes. But, of all birds, they are shot most easily, as they always make a whirring noise when they rise, by which they alarm the gunner, and being a large mark, and flying very slow, there is scarce any missing them.*

The pheasant is a very bold bird when first brought into the yard among other poultry, not sparing the peacock, nor even such young cocks and hens as it can master; but, after a time, it will live tamely among them, and will at last couple with a common hen. The breed thus produced take much stronger after the pheasant than the hen; and in a few successions, if let breed

* When taken young, they become as familiar as chickens; and when designed for breeding, are put together in a yard, five hens to a cock; for this bird, like all of the poultry kind, is very salacious. In her natural state the female makes her nest of dry grass and leaves; the same must be laid for her in the pheasandry, and she herself will sometimes properly dispose them. If she refuses to hatch her eggs, a common hen must supply her place, which task she will perform with perseverance and success. The young ones are with difficulty reared, and must be supplied with ants' eggs, the food the old one leads them to gather when wild in the woods. These are chopped up with curds or other meat; and the young ones are fed with great exactness, both as to the quantity and time of their supply. This food is sometimes varied, and wood-lice, earwigs, and other insects, make a variety. The place where they are reared must be kept extremely clean, their water be changed twice or thrice a-day; they must not be exposed till the dew is off the ground in the morning, and should always be taken in before sun-set. When they become adult, they can very well shift for themselves, and are particularly fond of oats and barley.

with the cock-pheasant (for the mixture is not barren,) there will be produced a species tamer, stronger, and more prolific; so that it is strange why most of our pheasandries are not stocked with birds thus produced.

The pheasant, when full grown, seems to feed indifferently upon every thing that offers. A French writer states, that one of the king's sportsmen shooting at a parcel of crows gathered round a dead carcase, to his great surprise, upon coming up, found he had killed as many pheasants as crows. It is even asserted by some, that such is the carnivorous disposition of this bird, that when several of them are put together in the same yard, if one happens to fall sick, or seems to be pining, all the rest will fall upon, kill, and devour it.

Persons of fortune are fond of stocking their woods and plantations with the pheasant; and in this climate it seems to require the protection of man. In a state of nature it subsists on grain, berries, and herbage, nestles on the ground, and lays from twelve to fifteen eggs. Being a heavy bird, it takes but short flights, and would never have been able to reach remote islands and continents, had it not been imported. In some parts of America, it has been propagated by the Spaniards, but was not originally a native of the new world. Its voice nearly resembles that of the common cock; and its flesh being considered a peculiar delicacy, it is protected by the game-laws, and therefore seldom falls to the lot of any, except the great, and the different kinds of vermin; which latter come in for more than a full share.

THE TURKEY.

—————The turkey nigh,
Loud threat'ning, reddens: ———

THOMSON.

THE turkey has a caruncle on the forehead and throat, and the breast of the male has a bristly tuft. The tail is broad and expansile, the bill short and strong, and the colour dark brown, mixed or barred with white.

No ancient author mentions this bird; and as it does not appear to have been known in Europe before the discovery of America, there is strong presumption that it came from that country. It is difficult to rear with us, yet it stands the cold of a Canadian winter in a state of

nature. It affords much pastime to sportsmen, and is hunted with dogs, which for a time it outstrips; but being at last tired, it takes shelter in a tree, where it sits in stupid indifference, till the hunters come up, and knock it down with a pole.

Turkeys, though naturally arrogant and impetuous when they can intimidate, are cowardly when attacked. The domestic cock will often keep them at a distance, and if he yields, it is rather to force than courage. The turkey-cock is remarkable for his gobbling disagreeable noise, and blustering disposition; but, like many among the human race, who imitate him in those qualities, he shrinks before genuine resolution, and is only valiant against the unresisting. The hen, in general, is much more mild and gentle, and performs the duty of a mother with the utmost assiduity. She conceals her eggs from the male, who would probably break them, because he is unwilling to be deprived of the society of his mate, and after an incubation of twenty-eight days, the young are brought to light, and attended with extreme solicitude. They are very tender creatures, but their flesh, when sufficiently grown, is so highly esteemed, that no pains are spared in rearing them.

In a wild state, turkies are gregarious, and sometimes weigh forty pounds. The American Indians make an elegant kind of cloth of their feathers.

THE GUINEA-HEN.

THE guinea-hen is a native of Africa, but has long been domesticated in this country. It is known by a double caruncle at the corner of the mouth, and a rounded back. On each side of the head there is a kind of coloured fleshy horn, and the beak is furnished with cere near the nostrils. It is larger than a common hen. Its body is sloped like that of a partridge, and its colour is a dark grey, beautifully spotted with small white specks, a black ring round the neck; its head is reddish, and it is blue under the eyes. They naturally congregate in large numbers, and breed up their young in common, the females taking care of the broods of others, as well as of their own. In Guinea they go in flocks of two or three hundred, perch on trees, and feed on worms and grasshoppers; they are run down and taken by dogs,

and their flesh is tender and sweet, generally white, though sometimes black. They breed very well with us. They have been transported into the West Indies and America, and are now wild in those places as well as domesticated.

It is a noisy, restless, and turbulent bird, and though it lays a great number of eggs, it shews little maternal affection, often abandoning its young to their fate. None of its habits indeed entitle it to much respect or attention: and it is rather kept as a curiosity than for any peculiar good or valuable qualities it possesses. Its flesh, however, is sufficiently delicate, and preferred by epicures to that of domestic poultry.

THE PEACOCK.

————— the peacock spreads
His every-colour'd glory to the sun,
And swims in radiant majesty along.

THOMSON.

IF superiority were acquirable by beauty, the peacock would be indisputably the king of birds. On none of the feathered race has nature bestowed a more elegant form, or such richly coloured plumage.

It is from the tip of the bill to the end of the tail about three feet eight inches long. The bill is nearly two inches, and of a brown colour. The irides are yellow. On the crown there is a fine crest, turning forwards, of twenty-four feathers, webbed only at the ends, which are gilded green. The shafts are whitish, and the head, neck, and breast are a green gold colour. Above and beneath the eye is a streak of white, as are the back and rump, glossed over with copper, the feathers are distinct, and lie over each other like shells. Above the tail springs an inimitable set of beautiful feathers, each adorned with a variegated eye at the end: and these reaching considerably beyond the tail, their length in many birds being four feet and a half. This beautiful train, falsely called tail, may be expanded quite to a perpendicular upwards, at the will of the bird. The true tail, hidden beneath this group of feathers, consists of eighteen grey brown feathers, eighteen inches long, marked on the sides with rufous grey; the belly and vent are greenish black, the thighs yellowish,

the legs stout grey brown, those of the male furnished with a strong spur three-quarters of an inch long.

This bird, now so common in Europe, is of eastern origin, being a native of India. They are found wild in Ceylon, Java, St. Helena; Bermuda, and other West India islands. They are no where so large or fine as in India, in the neighbourhood of the Ganges, whence they have spread into all parts, increasing in a wild state in the warmer climes, but wanting some care in the colder regions. They are caught in India by carrying lights to the trees where they roost, and having painted representations of the bird presented to them at the same time; when they put out the neck to look at the figure, the sportsman slips a noose over the head, and secures his game. In most ages they have been esteemed as a salutary food.

In a word, no human art can imitate the vivid tints of this bird's plumage; and as it struts in the sun, every moment produces a thousand shades of undulating and evanescent colours, instantly replaced by other tints, always changing, yet ever brilliant. But nature, as if determined to shew how valueless beauty is without merit, has given the peacock a harsh, discordant voice, and denied it any share of sagacity, further than is necessary for the continuance of its kind. It is proud, vain, quarrelsome, and formed only to captivate the indiscriminating eye. Like all the poultry kind, this bird feeds on grain, insects, and tender plants. In its appetites, however, it is extremely capricious, and sometimes mischievous. It will strip the tops of houses of their tiles and thatch, and lay waste the labours of the gardener, by destroying his choicest seeds, and nipping his most favourite flowers.

The female* is rather less than the male. The train is

* The female lays five or six greyish white eggs, in hot climates twenty, the size of those of a turkey. These, if let alone, she lays in some secret place, at a distance from the usual resort, to prevent their being broken by the male. The time of setting is from twenty-seven to thirty days. The young may be fed with curd, chopped-leeks, barley-meal, &c. moistened; and are fond of grasshoppers, and some other insects. In five or six months they will feed as the old ones on wheat and barley, with what else they can pick up in the circuit of their confinement.

much shorter than the tail, and scarcely longer than its coverts; nor are the feathers furnished with eyes. The crest on the head is similar to that on the head of the male: the sides of the head have more white, the throat and neck are green, the body and wings cinereous brown, the breast is fringed with white, the irides lead-coloured. In some male birds all the wing coverts and scapulars are of a fine deep blue green, very glossy, but the outer edges of the wing and quills are of the common colour.

The young acquire the perfect beauty of their plumage in the third year, and it is supposed, on good authority, that they will live to the age of twenty-five.*

Aged females sometimes acquire the plumage of the male: the same has been observed by naturalists in the pheasant.

THE GROUSE TRIBE,

O'er the tractless waste,
The heath-hen flutters, pious fraud! to lead
The hot pursuing spaniel far astray.

THOMSON

INCLUDES the different species of grouse, partridges, and quails. The former chiefly frequent cold, bleak, and mountainous tracks of country, and have thin legs, feathered down to the very toes. Partridges and quails, on the contrary, inhabit warmer, and more cultivated

* So beautiful a species of birds as the peacock, could not long remain a stranger in the more distant parts where they were produced; for, in the days of Solomon, we find, among the articles imported by his Tarshish navy, apes and peacocks. A monarch so conversant in all branches of natural history, "who spoke of trees, from the cedar of Lebanon, even unto the hyssop that springeth out of the wall; who spoke also of beasts and of fowl;" would certainly not neglect furnishing his officers with instructions for collecting every curiosity in the countries they visited, which gave him a knowledge that distinguished him from all the princes of his time. They were brought into Greece from some barbarous country, and were so highly esteemed, that a male and female were valued at Athens at one thousand drachms, (32*l.* 5*s.* 10*d.*). Their next step might be to Samos; where they were preserved about the temple of Juno, being the birds sacred to that goddess; and Gellius commends the excellency of the Samian peacocks; probably they were brought there originally for the purpose of superstition, and afterwards cultivated for those of luxury. We are told, when Alexander was in India, he found vast numbers of wild ones on the banks of the Hyarotis; and was so struck with their beauty, as to appoint a severe punishment on any person that killed them

districts, and approach nearer to our domestic fowls. The flesh of the whole race is brown, but delicious food.

THE COCK OF THE WOOD.

Is the largest of the grouse kind, and little inferior in size to a turkey, was formerly an inhabitant of the pine forests in the north of Scotland. It is common on the Alps and Pyrenees, whence it sometimes descends into the level country to prey on the corn.

Its plumage is of a pale brown or ash colour, elegantly crossed or motled with small dusky spots and minute bars; the head and neck with broad bars of black, rust colour, and white, the belly and wings white, but the shafts of the great quill-feathers black. In the male the grey predominates, except on the head and neck, where is a mixture of red, with bars of white. The females and young birds have much rust-colour. The tail consists of sixteen feathers; the two middle ash-coloured, motled with black, and tipped with white; the two next black, slightly marked at the end with white, the rest wholly black, the feathers incumbent on the tail are white, and almost cover it.

They are found in these kingdoms only on the summits of the highest hills of the Highlands of Scotland, of the Hebrides, and Orkneys; and a few still inhabit the lofty hills near Keswick, in Cumberland, as well as the mountains of Wales. They live amidst the rocks, perching on the grey stones, the general colour of the strata in those exalted situations. They are very silly birds; so tame as to bear driving like poultry; and, if provoked to rise, take very short flights, making a great circuit like pigeons. Like the grouse, they keep in small packs, but never, like those birds, take shelter in the heath, but beneath loose stones. To the taste they scarce differ from a grouse.

These birds are called by Pliny *lagopi*, their feet being clothed with feathers to the claws; as the hare's are with fur, the nails are long, broad, and hollow. The first circumstance guards them from the rigour of the winter; the latter enables them to form a lodge under the snow, where they lie in heaps to protect themselves from the cold. The feet of the grouse are clothed

in the same manner; but those of this species which perch upon trees, are naked, the legs only being feathered, not being in want of such a protection.

Altogether this is a fine bird, and the two sexes differ considerably in colour. They never pair, but, about the beginning of February, the cock, perched on the top of a tree, calls all the females round him, by a loud peculiar note, and his summons is instantly obeyed.

The hen lays on the ground, from eight to sixteen eggs, which she carefully covers with moss, when obliged to quit her nest in search of food.

THE BLACK COCK,

Is in length twenty-two inches, and weighs near four pounds, the bill is dusky, and the plumage of the whole body black, with a shining blue gloss over the neck and rump. The coverts of the wings are dusky brown; the inner coverts white, the thighs and legs are covered with dark brown feathers. The tail, of sixteen black feathers, is much forked, the exterior feathers bend greatly outwards, and their ends seem as if cut off. The female weighs only two pounds, and in length is one foot six inches. The head and neck are marked with alternate bars of dull red and black, the breast with dusky black and white, but the last predominates. The back, coverts of the wings, and tail, are of the same colours as the neck, but the red is deeper; the tail is slightly forked, it consists of eighteen feathers variegated with red and black. The feathers under the tail are white, marked with a few bars of black and orange.

It is fond of woody and mountainous situations; feeding on bilberries and other mountain-fruits, and in the winter on the tops of the heath. In summer they frequently descend from the hills to feed on corn. They never pair: but in the spring the male gets upon some eminence, crows and claps his wings, on which signal all the females within hearing resort to him. The hen lays seldom more than six or seven eggs, of a dull yellowish white colour, marked with numbers of very small ferruginous specks, and towards the smaller end with some blotches of the same hue. When the female is obliged, during the time of incubation, to leave her eggs in quest of food she covers them up so artfully with moss or dry

leaves, that it is very difficult to discover them. On this occasion she is extremely tame and tranquil, however wild and timorous at other times. She often keeps to her nest, though strangers attempt to drag her away. As soon as the young ones are hatched, they are seen running with extreme agility after the mother, though sometimes they are not entirely disengaged from the shell. The hen leads them forwards for the first time into the woods, to show them ants' eggs, and the wild mountain-berries, which, while young, are their only food. As they grow older their appetites grow stronger, and they then feed upon the tops of heather, and the cones of the pine-tree. In this manner they soon come to perfection; they are hardy birds, their food lies every where before them, and it would seem that they should increase in great abundance. But this is not the case, their numbers are thinned by rapacious birds and beasts of every kind, and still more by their own salacious contests. As soon as the hatching is over, which the female performs in the manner of an hen, the whole brood follows the mother for about a month or two, at the end of which the young males entirely forsake her, and keep in great harmony together till the beginning of spring. At this season they begin, for the first time, to feel the amorous passions, and then adieu to all their former friendships. They consider each other as rivals, and the rage of concupiscence quite extinguishes the spirit of society. They fight each other like game-cocks; and at that time are so inattentive to their own safety, that it often happens that two or three of them are killed at a shot. It is probable, that in these contests the bird which comes off victorious takes possession of the female seraglio, as it is certain they have no faithful attachments.

The black cock frequents heaths and woods of birch and poplar, and during winter, often buries itself in the snow. In particular parts of New Forest, in Hampshire, it is preserved as royal game. In the more southern countries of Europe, these birds are very plentiful, and every where are valued for their flesh, and for the sport they furnish.

THE RED GROUSE.

THESE birds are not uncommon in the heathy and mountainous parts of England, and are pretty plentiful in Wales and Scotland, but they have not been observed in any of the countries of the continent. The male weighs about nineteen ounces, and is in length fifteen inches and a half. The bill is black, the irides hazel-coloured, the throat is red, the plumage on the head and neck of a light tawny red, each feather is marked with several transverse bars of black, the back and scapular feathers are of a deeper red, and on the middle of each feather is a large black spot, the breast and belly are of a dull purplish brown, crossed with numerous narrow dusky lines, the quill-feathers are dusky, the tail consists of sixteen feathers of an equal length, all black, except the four middlemost, which are barred with red, the thighs are of a pale red, barred obscurely with black, the legs and feet clothed to the very claws with thick soft white feathers. The claws are whitish, very broad and strong. The female weighs only fifteen ounces. The colours in general are duller than those of the male, the breast and belly are spotted with white, and the tips of some of the coverts of the wings are of the same colour. These birds pair in the spring, and lay from six to ten eggs. The young brood follow the hen the whole summer, in the winter they join in flocks of forty or fifty, (which are termed packs by sportsmen,) and become remarkably shy and wild; they always keep on the tops of the hills, are scarce ever found on the sides, and never descend into the valleys. Their food is the mountain-berries and tops of the heath. The flesh, as in all the rest of the family, is extremely delicate.

THE PARTRIDGE

THIS well-known and highly-valued bird has a naked scarlet spot under the eyes, a ferruginous tail, a brown breast, and whitish feet. It is a native of Europe and Siberia; but seems to thrive best in temperate latitudes and well cultivated countries, as it subsists chiefly on the labours of the husbandman.

In England, where the partridge is much scarcer, and a great deal dearer, it is still a favourite delicacy at the

tables of the rich, and the desire of keeping it to themselves has induced them to make laws for its preservation, no way harmonising with the general spirit of English legislation.

The partridge seems well-known over all the world, being found in every country and climate; and even seeming to adapt itself to the nature thereof. In Greenland, the partridge, which is brown in summer, as soon as the icy winter sets in, begins to take a covering suited to the season: it is then clothed with a warm down beneath; and its outward plumage assumes the colour of the snow among which it seeks its food; thus being doubly fitted for the place, by the warmth and the colour of its plumage; the one defending it from the cold, the other preventing its being noticed by the enemy. Those of Barakonda, are long-legged, much swifter of foot, and reside in the highest rocks and precipices. They all, however, are immoderately salacious, and sometimes even to an unnatural degree; the male will pursue the hen to her nest, and break her eggs rather than not indulge his propensities.*

Partridges pair in February, and the female lays from fifteen to eighteen eggs, in a rude nest formed in the ground. The period of incubation is three weeks, and the young, called covies, follow the hen a considerable time, and experience from her the utmost instinctive affection. So attentive is she to her maternal duties, that she has been known to be carried in a hat with her eggs to a considerable distance, and in confinement to have produced her brood. The young are very fond of the grubs of ants, and the parents conduct them to ant-hills, as soon as they are excluded from the shell. The partridge, however, is a stupid creature. It will sometimes hide its head in any hole, and leave its body exposed, as if it imagined it could not be seen, if it did not see. If reared by the hand, it soon neglects the feeder, and seldom has been known to remain tame, after it arrived at maturity, or to shew any attachment to the place where it was bred.

* Though the young ones have kept together in flocks during the winter, when they begin to pair in spring their society disperses, and combats very terrible to each other ensue.

Their manners in other circumstances resemble all those of poultry in general ; but their cunning and instinct seem superior to those of the larger kinds. Perhaps, as they live in the neighbourhood of their enemies, they have more frequent occasion to practice their little arts of evasion or safety. Whenever a dog, or other formidable animal, approaches their nest, the female uses every means to draw him away ; she keeps before him, pretends to be incapable of flying, just hops up, and then falls down, but never goes off so far as to discourage her pursuer. At length, when she has drawn him entirely away from her secret treasure, she at once takes wing, and fairly leads him to gaze after her in despair. After the danger is over, and the dog withdrawn, she then calls her young, who assemble at once at her cry, and follow where she leads them.

THE QUAIL.

THE quail, much less than the partridge, has a greyish spotted body, white eye-brows, and the margin of the tail feathers, and a lunated spot on them, are ferruginous. Though it is far more universally diffused than the partridge, it is less common in this country, and is a bird of passage

The feathers of the head are black, edged with rusty brown ; the breast is of a pale yellowish red, spotted with black, the feathers on the back are marked with lines of pale yellow, and the legs are of a pale hue. Except in the colours thus described, and the size, it every way resembles a partridge in shape, and except that it is a bird of passage, it is like all others of the poultry kind in its habits and nature.

The quail seems to spread entirely throughout the old world, but does not inhabit the new ; it is seen from the Cape of Good Hope quite to Iceland, and is found in Falkland isles, also in New Zealand, Russia, Tartary, and China ; and, in short, is mentioned by so many travellers, and in so many places, that we may almost call it an inhabitant of all. It shifts quarters according to the season, coming in vast flocks, northward in spring, and departing south in autumn, like other migrating birds. On the west coast of Naples, within the space of four or five miles, an hundred thousand have been taken in a

day, which have been sold for eight livres per hundred to dealers, who carry them for sale to Rome. Great quantities also sometimes alight in spring on the coasts of Provence, near the sea, and appear, at their first landing, so much fatigued, that they are often taken by the hand. These circumstances leave not a doubt of their being the same kind of birds, which divine providence directed in such quantities to cover the camp of the murmuring Israelites.

In the autumn, great quantities are frequently imported into England from France for the table, frequently seen on their passage to London by the stage-coaches, about an hundred in a large square box, divided into five or six partitions one above another, just high enough to admit of the quails standing upright; these boxes have wires on the fore-part, and each partition furnished with a little trough for food; and they may be conveyed thus to great distances without difficulty.

It feeds like the partridge, and like that bird makes no nest, except a few dry leaves or stalks scraped together may be called so, and sometimes an hollow on the bare ground suffices. In this the female lays her eggs, to the number of six or seven, of a whitish colour, marked with irregular rust-coloured spots, the young follow the mother as soon as hatched, like young partridges. They have but one brood in a year.

The female lays about ten eggs, and the period of incubation lasts three weeks. Except during the union that subsists between the young and the mother, till they are able to provide for themselves, quails are not naturally social. They are seldom seen in covies, nor do they collect except on some powerful motive, such as emigration.

These birds usually sleep during the day, concealed in the tallest grass, and are so indolent, that a dog must absolutely run upon them, before they will rise, and even when forced on the wing, they seldom fly far. They are easily drawn within the reach of a net, by a quail pipe. They are supposed to winter in Africa, and return to this country early in the spring. Their flesh is highly esteemed. Quails live on grain, which they procure chiefly by night, when they almost incessantly repeat their cry.

Quail fighting was a favourite amusement among the Athenians. They abstained from the flesh of this bird, deeming it unwholesome, as supposing that it fed upon the white-hellebore, but they reared great numbers of them for the pleasure of seeing them fight : and staked sums of money, as some do with regard to cocks, upon the success of the combat. Fashion, however, has at present changed with regard to this bird, persons take no pleasure in its courage, but its flesh is considered as a very great delicacy. Quails are easily caught by a call, the fowler early in the morning having spread his net, hides himself under it among the corn ; he then imitates the voice of the female with his quail-pipe, which the cock hearing, approaches with the utmost assiduity.

THE COMMON BUSTARD.

BIRDS of the bustard kind have a bill somewhat convex, open oblong nostrils, long legs, naked above the knees, and only three toes, all of which are placed forward.

The common bustard is the largest land-fowl which is a native of Britain, measuring nearly four feet in length, and in breadth nine, and weighing twenty-five pounds ; the head and neck are ash-coloured ; the back is transversely barred with black and bright ferruginous, and the belly is white. On each side of the lower mandible is a tuft of feathers, about nine inches long. The female is only about half the size of the male, and her colours are less bright.

The bustard delights in open and unfrequented countries, and is sometimes seen in Dorsetshire, on Salisbury Plain, near Newmarket, and on the wolds of Yorkshire. It is of a timid and solitary disposition, runs swiftly, takes wing with difficulty, and therefore is commonly hunted with dogs. It feeds on seeds, herbage, and worms. The female makes a rude nest in the ground, near some corn-field, lays two eggs, and sits thirty days. The flesh is highly esteemed. Under the tongue is the orifice of a sack or bag, in which this bird can carry about seven English pints of water, which serves as a reservoir against thirst.

THE PIGEON TRIBE.

PIGEONS form the connecting link between poultry and the sparrow tribes. Some one of the species is dispersed

over most parts of the world. Their principal food is grain; they drink much, and associate in pairs. The female lays two eggs, which produce generally a male and a female. They breed several times in the year; and the parent birds alternately divide the labour of incubation.

THE COMMON PIGEON,

BEING the original of all our domestic varieties, is called the Stock-Dove; and it is found wild in many parts of our island, forming its nest in the holes of rocks, old towers, and decayed trees. The body is ash-coloured, the upper part of the neck is of a shining green; on the wings is a fillet, and the tip of the tail is blackish. On the approach of winter, this bird migrates from its more northerly summer-retreats, and again retires, except a few that breed with us in the spring.

THE DOMESTIC PIGEON.

O'er the whole homely scene, the cooing dove
Flies thick in amorous chace, and wanton rolls
The glancing eye, and turns the changeful neck.

LIKE all creatures which have long been reclaimed, the domestic pigeon varies much in colour. It breeds about nine times in the year, producing each time a male and a female. Both parent birds incubate by turns, and feed their young by bringing up the grain taken into their crops, after having macerated it. The flesh is generally esteemed, but is considered improper for melancholy persons.

There are upwards of twenty varieties, of which tumblers, jacobins, croppers, runts, turbits, and carriers, are the chief. The latter obtain their name from the circumstance of their conveying letters and small packets, from one place to another. Lithgow informs us, that a bird of this kind will carry a letter in forty-eight hours from Babylon to Aleppo, which usually employs a man thirty days; and, some years ago, it was proved that a carrier-pigeon flew from Bury St. Edmunds to London, a space of seventy-two miles, in two hours and a-half.

THE RING-DOVE

Is the largest of British pigeons; the tail-feathers are black, the quill-feathers whitish on the exterior margin, and the neck white on the sides. It builds its nest of dry sticks in trees, and its young are produced after fourteen days hatching. In winter, ring-doves assemble in large flocks, and leave off cooing, which, however, they renew again, as soon as they pair in spring. Probably the greater part migrate, as they always appear most numerous in winter.

Grain is their usual food, with a mixture of green vegetables. Attempts have been made to domesticate these birds, but they have always returned to their natural independence, as soon as they found an opportunity.

THE TURTLE-DOVE.

———— All abandon'd to despair, she sings
Her sorrows thro' the night; and, on the bough,
Sole sitting, still at every dying fall
Takes up again her lamentable strain
Of winding woe; till, all around, the woods
Sigh to her song, and with her wail resound.

THE back is a bluish grey, the breast flesh-coloured, the tail-feathers white at the point, and a black spot and whitish lines appear on each side of the neck.

This is a very shy and retired bird, breeding in thick woods, and making its nest in very high trees. Its note is plaintive and melancholy, and its attachment to its mate is proverbial; but though, when a male and a female have been brought up together in a cage, they have sometimes been found unable to survive the loss of each other, there is reason to suppose that, in a state of nature, they are less constant.

THE SPARROW FAMILY

COMPREHENDS all those between the thrush and the wren. They are a numerous and active race, widely diffused, and remarkable for their beauty and powers of song. By their melody they enliven the most sequestered scenes; they haunt our gardens without fear, and, conscious of deserving favour, live in the vicinity of man with some confidence. Their principal

food is insects and grain, and though some consume much of the latter, they make ample compensation by their destruction of the former. Their bills are conical, and pointed at the end.

THE STARLING.

THIS elegant and well-known bird is naturally very familiar, and easily trained to confinement. Its voice is not very captivating; but it may be taught with ease to repeat short sentences, or whistle tunes with great exactness. Its pliant throat accommodates itself to every inflection and every accent. It can readily articulate the letter R, and acquires a sort of warbling which is much superior to its native song. This bird is spread through an extensive range in the ancient continent, and is every where nearly the same; whereas American starlings present a great diversity of appearance. And few of our readers will forget Sterne's starling, which was constantly repeating, "I can't get out:" thus at once expressing the misery of captivity, and giving a warning voice to avoid it.

The weight of the male is about three ounces; that of the female rather less. The length is eight inches three quarters: the bill brown or yellow, but in old birds mostly yellow. The whole plumage is resplendent black with changeable blue, purple, and copper; each feather marked with a pale yellow spot. The lesser coverts are edged with yellow, and slightly glossed with green. The legs of a reddish brown. They breed in hollow trees, eaves of houses, towers, ruins, cliffs, or high rocks over the sea, such as those of the Isle of Wight. It lays four or five eggs, of a pale greenish ash-colour, and makes its nest of straw and small fibres of roots.

In a state of nature, they collect in vast flocks during winter, and their whirling mode of flight may be known at a great distance. They chatter much in the evening and morning, when they usually assemble and disperse; and so attached are they to society, that they will join the company of birds of a different species, rather than remain alone. In the fens of Lincolnshire, they collect in myriads, and break down the reeds with their weight. They feed principally on snails, worms, and insects, but have no objection to grain, seeds, and fruits.

Their flesh is so bitter as to be scarce eatable. They are fond of following oxen and other large cattle as they feed in the meadows, attracted by the insects which flutter round them; or by those, perhaps, which swarm in their dung, or in meadows in general. They are also accused of feeding on the carcasses exposed on gibbets, but probably only in search of insects. They live seven or eight years in the domestic state. The wild ones cannot be decoyed by the call, because they regard not the scream of the owl.

THE MISSEL THRUSH.

THIS bird is the largest of British songsters. Its length is eleven inches, its breadth sixteen inches and a half. The bill is shorter and thicker than that of other thrushes; dusky, except the lower base of the mandible, which is yellow; the irides are hazel; head, back, and lesser coverts of the wings a deep olive-brown, lower part of the back tinged with yellow; the tail brown; the three outermost feathers tipped with white. These birds build their nests in bushes, or on the side of some tree, generally an ash, and lay four or five eggs: their note of anger, or fear, is very harsh, between a chatter and shriek; from whence some of its English names. Its song, however, is very fine: which it begins while sitting on the summit of a high tree, very early in the spring, often with the new-year, in blowing showery weather, which makes the inhabitants of Hampshire call it the storm-cock. It feeds on insects, holly and misseltoe berries, which are the food of all the thrush kind: in severe snowy weather, when there is a failure of their usual diet, they are observed to scratch out of the banks of hedges the root of arum, or the cuckoo pint; this is remarkably warm and pungent, and a provision suitable to the season.

It may be considered as the sovereign of the grove; for it drives away from its haunts all the inferior species of the thrush kind. The writer of this has observed it on the top of a lofty leafless tree, pouring out its mellow notes before Christmas, in mild seasons, regardless of the wind, which caused it to dance as it were in the air.



THE THRUSH



THE FIELD-FARE

Is in length ten inches, in breadth seventeen. The head is ash-coloured inclining to olive, and spotted with black; the back and greater coverts of the wings of a fine deep chesnut, the tail is black, the legs are black, the talons very strong. This bird passes the summer in the northern parts of Europe. It breeds in the largest trees; feeds on berries of all kinds, and is very fond of those of the juniper. Field-fares visit us in great flocks about Michaelmas, and leave about the latter end of February or the beginning of March.*

THE COMMON THRUSH, OR THROSTLE,

————— The thrush

And woodlark, o'er the kind-contending throng
Superior heard; run through the sweetest length
Of notes; —————

Is in length nine inches, in breadth thirteen inches and a half. In colour, it so nearly resembles the missel-thrush, that no other remark need to be added, but that it is less, and that the inner coverts of the wings are yellow. The throstle is the finest singing-bird of the thrush kind, not only for the sweetness and variety of its notes, but for the long continuance of its harmony; for, as it sometimes breeds thrice a-year, it frequently obliges us with its song for near three parts of the year. It is the nearest rival to the nightingale, its song being a compound of several notes, which it combines with much skill, and continues for hours together.

Like the missel-bird, it delivers its music from the top of some high tree; but, to form its nest, descends to some low bush or thicket: the nest is made of earth, moss, and straw, and the inside is curiously plastered with clay. It lays five or six eggs, of a pale bluish green, marked with dusky spots.

* These birds and the redwings were the *turdi* of the Romans, which they fattened with crumbs of figs and bread. Varro informs us, that they were birds of passage, coming in Autumn and departing in the Spring. They must have been taken in great numbers, for, according to Varro (lib. 3. c. 5.) they were kept by thousands together in their fattening aviaries. They do not arrive in France till the beginning of December.

The thrush is widely diffused over Europe, and is every where a favourite, on account of its voice. It is frequently caged, and, though its notes are less sprightly in confinement, it well repays the trouble of feeding and attending it. In some countries, it is caught for its flesh, which has been highly esteemed ever since the times of antiquity; though it appears that its flavour is considerably affected, not only by the nature of its food, but the season of the year.

THE REDWING

HAS a very near resemblance to the throstle, but is less; their colours are much the same; only the sides under the wings and the inner coverts in this are of a reddish orange, in the throstle yellow; above each eye is a line of yellowish white, beginning at the bill and passing towards the hind part of the head. These birds appear in Great Britain a few days before the fieldfare; they come in vast flocks, and from the same countries as the latter. With us they have only a disagreeable piping note; but in Sweden, during the spring, they sing very finely, perching on the top of some tree among the forests of maples. They build their nests in hedges, and lay six bluish-green eggs spotted with black.

THE BLACKBIRD.

The blackbird whistles from the thorny brake.

THIS bird receives its name from the colour of its plumage; when it has attained its full age, it is of a fine deep black, and the bill of a bright yellow; the edges of the eyelids yellow. When young, the bill is dusky, and the plumage of a rusty black, so that the male is not to be distinguished from the female; but, at the age of one year, he attains his proper colour, and possesses no small reputation as a songster, though its note is too loud for any place but the groves. Nevertheless, it is often tamed; and, from the faculty of its imitating the sounds of any musical instrument, it may be taught any combination of notes which do not run into too great variety.

The female breeds early in the spring, making her nest generally in some bush, in which she lays four or



THE BLACKBIRD

five eggs, which produce as many young, after being hatched for about fourteen days.

Unlike the thrush, it is a solitary bird, preferring woods and retired situations, and seldom congregating with its kind. It commences its song early in the spring, and continues it through part of the summer; and, after the moulting season, resumes it again during autumn. It feeds on worms and shelled snails; to get at the animal, it breaks the shell with great dexterity against stones. In confinement it will eat crumbs of bread, and raw or dressed flesh.

On the Alps, and some other cold countries, the blackbird is frequently seen of a snowy whiteness. The species indeed is found in every climate, and is remarkable for its shyness and timidity. When domesticated, however, it is more restless than artful; more petulant than distrustful. If shut up in the same cage with other birds, it pursues and torments its fellow-prisoners, and seems to take a pleasure in being rude.

THE RING-OUZEL

Is larger than the black-bird; the length is eleven inches, breadth seventeen. The bill in some is wholly black, in others the upper half is yellow; the head and whole upper part of the body are dusky, edged with pale brown; the quill-feathers and the tail are black. The middle of the breast is adorned with a crescent, the horns pointing to the hind-part of the neck; in some birds of a pure in others of a dirty white. The females and young birds want this mark. The ring-ouzel inhabits the mountainous parts of Wales. They are also found in Dartmoor, in Devonshire, and in banks on the sides of streams. In Scotland and Wales they breed in the hills, but descend to the lower parts to feed on the berries of the mountain-ash.—To these we shall add,

THE MOCKING-THRUSH,

'Tis love creates their melody, and all
This waste of music is the voice of love;
That even to birds, and beasts the tender arts
Of pleasing teaches.

A NATIVE of America, about the size of a thrush, of a white and grey colour, and a reddish bill. It is pos-

sessed not only of its own natural notes, which are musical and solemn, but it can assume the tone of every other animal in the wood, from the wolf to the raven. It seems even to sport itself in leading them astray. It will at one time allure the lesser birds with the call of their males; and, when they have come near, terrify them with the screams of the eagle. No bird in the forest but it can mimic; and there is none but it has at times deceived by its call. But, unlike such as we usually see famed for mimicking with us, and who have no particular merit of their own, the mock bird is ever surest to please when it is most by itself. At those times it usually frequents the houses of the American planters; and, sitting all night on the chimney-top, pours forth the sweetest and most various notes of any bird whatever. It would seem that the deficiency of most other song-birds in that country is made up by this bird alone. They often build their nests in the fruit-trees about houses, feed upon berries and other fruits, and are easily rendered domestic.

THE BULLFINCH.

The mellow bullfinch answers from the grove.

THE head, wings, and tail of this bird are black; vent white, and breast ash-colour; the female has the underparts a reddish brown, less brilliant in her colours. When tamed, becomes remarkably docile, will come at call, perch on its master's shoulders, and, at command, go through its lesson. In its natural state it has merely two or three harsh notes; but is so susceptible of improvement, that, by a regular education, it becomes one of the greatest proficient in music. The female also is gifted with the powers of song, contrary to what prevails in other birds. But, according to Buffon, the bullfinch may be taught also to speak; in which case, he utters his little phrases with such an air of discernment and penetration, that, he appears as if animated by an intelligent principle. "I know a curious person, (says the author of the *Ædonologie*) who having whistled some airs quite plain to a bullfinch, was agreeably surprised to hear the bird add such graceful turns, that the master could scarcely recognize his own music, and acknowledged that the scholar ex-



THE BULLFINCH





THE SPARROW

celled him." This bird, however, will as readily acquire a vulgar as an elegant note:—One, which had only heard carters whistle, exactly imitated the coarseness of their manner.

But not in docility only do these birds excel; they seem susceptible of personal attachment. They have been known, after escaping and living a whole year in the woods, to recognize the voice of their mistress, and return to her protection. Others have died of melancholy, on being removed from the first objects of their regard. They are likewise mindful of injuries received, and though incapable of resenting them, evidently suffer from the reflection.

The bullfinch, during summer, chiefly frequents woods and retired places; but in winter approaches gardens and orchards, where it makes very free with the buds of trees, in search of insects. The female lays five or six eggs about the month of May, in a nest formed mostly of moss in some bush. She is easily distinguished from the male, whose superior brilliancy of colours is well known, particularly the rich crimson that adorns his cheeks and throat.

THE COMMON SPARROW.

——— And oft, when unobserv'd,
Steal from the barn a straw: till soft and warm,
Clean, and complete, their habitation grows.

HAS the prime-feathers of the wings and tail brown, the body variegated with grey and black, and a single white streak on the wings. It frequents our habitations, and is seldom absent from our gardens and fields. Though its note is only a chirp in a wild state, when early reclaimed, it may be taught to imitate the strain of the linnet, or goldfinch.

Few birds are more execrated by the farmer, and none perhaps more unjustly; from frequenting only habitations and parts adjacent, it may be said to be chiefly fed from human industry; for, in spite of every precaution, it will partake with the pigeons, poultry, &c. the food thrown out to them; grain of all kinds being most agreeable to its taste, though it will eat refuse from the kitchen. It is true, indeed, they consume a considerable quantity of grain and fruit, but then it should be

considered that a pair of them will destroy upwards of three thousand caterpillars in a week. They likewise feed their young with butterflies and other insects, which if suffered to live, would be the parents of numerous caterpillars.

Sparrows are proverbially salacious, and, early in the spring, build their slovenly nests of a little hay and feathers, generally under the eaves of houses, or in holes of walls,* and lay five or six eggs, reddish white and spotted brown. They frequently have three broods in a year. When such situations, however, are difficult to be procured, they accommodate themselves with trees, or any other safe retreat, sometimes expelling martins from theirs.†

The affection of the parent birds to their young is very extraordinary. They will follow them a considerable way, if removed from the nest; and if any opportunity is left, will continue to supply them with food.

In autumn they often collect into flocks, and roost in numbers on the neighbouring trees, when they may be shot by dozens; or at night caught in great numbers by a bat fowling-net. The flesh is accounted tolerable by many.

THE GOLDFINCH.

OF the finch kind are several species, most distinguished for their musical talents, but none equal to the goldfinch in beauty of plumage, elegance of form, or harmony of voice. The red, black, white, and golden yellow, which so copiously adorn this bird, would render it the object of universal admiration, was it more uncommon, and more difficult to be procured.

Some naturalists have given the goldfinch the second

* Two pairs of sparrows built their nests this last summer among some flower-pots, in the drawing-room windows of a house near town, and after rearing each two broods, continue to frequent their old haunts, in company with their offspring.

† Linnaeus repeats the following curious story respecting sparrows, from Albertus Magnus. After having expelled a martin from her nest, in the eaves of a house, a sparrow took possession of it, and seemed to bid the other defiance. But the ejected bird soon revenged the insult, by assembling its companions, and plastering up the opening with dirt, leaving the invader and family to perish by hunger, in this miserable dungeon.



THE GOLDFINCH



rank among our singing tribes; and, in point of beauty, it certainly deserves the first. It is much and deservedly esteemed for its docility, and the sweetness of its note, and is more commonly seen in a cage than any other of our British warblers. It is fond of orchards, and usually builds its elegant mossy nest in an apple or pear-tree, where it lays five eggs, spotted with purple; and sometimes has two broods in a year. Towards winter it assembles in flocks, and feeds on various kinds of seeds, but shews a predilection for those of the thistle above any others.

Goldfinches are tamed with much facility, and shew a peculiar aptness for receiving instruction. They are easily taught to perform several movements with accuracy, to draw up their water in small cups fastened to a chain, to fire a cracker, and other tricks which would appear unnatural for a bird to perform.*

There is a variety of goldfinch, called by the London bird-catchers a cheverel, from the manner in which it concludes its jerk. It is distinguished from the former by a white streak, or by two, sometimes three, white spots under the throat. Their note is very sweet; and they are much esteemed on that account, as well as for their great docility. Towards winter, they assemble in flocks; and feed on seeds of different kinds, particularly those of the thistle. It is fond of orchards, and frequently builds in an apple or pear-tree: its nest is very elegantly formed, of fine moss, liverworts, and bents, on the outside; lined first with wool and hair, and then with the goslin or cotton of the sallow. When kept in cages,

* Some years ago, an Italian exhibited in this country the wonderful feats of goldfinches, and some other birds. One appeared dead, and was held up by the tail or claw, without manifesting any signs of life. A second stood on its head, with its claws elevated in the air. A third imitated a Dutch milk-maid, going to market, with pails on her shoulders. A fourth mimicked a Venetian girl looking out at a window. A fifth appeared in military attire, and mounted guard as a sentinel. The sixth was a cannoneer, with a cap on its head, a firelock on its shoulder, and a match in its claw, which it applied to a small cannon, and fired it. The same bird also affected to be wounded, was wheeled in a little barrow, as it were to the hospital, after which it started up, and flew away before the company. The seventh bird turned a kind of windmill. And the eighth and last stood in the middle of some fire-works, which were discharged all round it, without exhibiting a symptom of fear.

they are commonly fed much on hempseed, which they eat freely, but it makes them grow black, and lose both their red and yellow.

THE CHAFFINCH

HAS black limbs, and the wings white on both sides; the three first feathers of the tail are without spots, but two of the chief are obliquely spotted. It has its name from its delighting in chaff. This species entertains us with its song very early in the year, but towards the end of summer assumes a chirping note. In Hampshire vast flocks of females assemble with scarcely any males among them. Their nest is almost as elegantly constructed as that of the goldfinch, and of much the same materials, only the inside has the addition of some large feathers. They lay four or five eggs, of a dull white colour, tinged and spotted with deep purple. They are caught in plenty in flight time; but their nests are rarely found, though they build in hedges and trees of all sorts. They are seldom bred from the nest, as being a bird not apt to learn another's song, nor to whistle; so that it is best to leave the old ones to bring them up. The Essex finches are allowed to be the best, for both length of song and variety, ending with several notes that are very pretty. It is a hardy bird, and will live almost upon any seeds, none coming amiss to him. He is seldom subject to disease, but will be very lousy if not sprinkled with wine two or three times a month.

THE CANARY-BIRD.

THOUGH this bird is not originally a native of this country, but of the Canary islands, (whence its name,) and where they are still found, it has so long been bred and domesticated in Europe, and is so often seen in the cage, that it unquestionably claims a place in this part of our work. It appears to have been first introduced into this quarter of the globe about the fourteenth century; but though these birds thrive perfectly under the protection of man, our climate is too cold to allow them to breed in a wild state, and therefore they are reared in houses with considerable care.

The song of the canary-bird is usually composed of the titlark or the nightingale's notes. Mr. Barrington



THE CANARY BIRD

saw two birds, which were imported from the Canary islands, that were destitute of voice; which he was informed was not uncommon. Most of those from the Tyrol, where immense numbers are reared, have been educated under parents whose progenitors were instructed by a nightingale. Our English canaries, however, have more of the titlark than of the nightingale's notes; and by many, when in full song, are thought too loud for an apartment, in which people sit conversing. The more general the conversation, the more the little warbler strains its throat, and drowns the human voice in its shriller modulations, which it continues for some time in one key, without intermission: then raises it higher and higher by degrees, with great variety of tones.*

In Europe, the canary-bird exhibits all that diversity of colouring usually the effect of long continued domestication. Like our common poultry, they are of most colours, white, mottled, and green; but in their native woods, are of a dull and uniform green, and devoid of that variety of rich plumage so much admired in our tame birds; indeed, they will intermix with the goldfinch, and similar birds, and thus acquire colours and habits not belonging to the pure breed; but sterility marks this progeny, and nature returns to her regular course.

THE LINNET.

Nor are the linnets, o'er the flowering furze
Pour'd out profusely, silent.

THOUGH, in point of external beauty, the linnet cannot be compared with the goldfinch or the canary-bird, by some its song is not less esteemed than their's. Indeed, it is generally valued for its notes, and therefore frequently pays the price of admiration in captivity. In every state, it shews a particular predilection for the

* Many instances might be cited of religious meetings on the Sunday mornings in houses, when the birds have uniformly whistled while the persons sung, and been silent when they ceased. An old lady of my acquaintance had a fine canary-bird that perfectly imitated a well-taught parrot, and would ask for a "cup of sack," &c. as plainly as its mate.

seed of *linum* or flax, from which circumstance it receives its name.

The linnet usually builds in some thick bush or hedge, and lays four or five eggs. The young are hatched towards the latter end of April, or the beginning of May; and if intended to be brought up tame, may be taken from the nest at ten days old; for at that period they will acquire any notes most familiar to their ears, and within the compass of their throats. Yet the native voice of the linnet is so sweet, that little pleasure can be derived from superinducing strains foreign to its species, however much curiosity may be amused. Some fanciful persons have, however, attempted to teach it the use of speech, but it has never been known to make any great progress in this art, without long and unintermitted pains.

THE RED-POLE

Is less than the linnet, with a rich spot of purplish red on the forehead; the breast is of the same colour, but less bright. The female is less lively in colour, has no red on the breast, and the spot on the forehead is of a saffron hue. This species is common enough in England, and lays four or five eggs, of a pale blueish green, the blunt end thickly sprinkled with small red spots. Mr. Pennant mentions an instance of this bird being so tenacious of her nest, as to suffer herself to be taken off by the hand, and that when released she would not forsake it. It is very fond of the seeds of alder. Whole flocks of them frequent places where alders grow, to pick the catkins; they generally hang like the titmouse, with the back downwards; and in this state are so intent on their work, that they may be entangled one after another by dozens, by a twig, smeared with bird-lime, fastened to the end of a fishing-rod. This species seems to be a bird common to the whole of the northern part of the globe without exception.

THE TWITE

Is about the size of a linnet. It has the feathers of the upper part of the body dusky, those on the head edged with ash-colour, the others with brownish red: the rump is pale crimson; the wings and tail are dusky, the



THE LINNET

tips of the greater coverts and secondaries whitish; the legs pale brown. The female wants the red mark on the rump. Twites are taken in the flight-season near London, along with linnets. Probably their name has been taken from their twittering note, having no music in it; and, indeed, merely from this circumstance, the bird-catchers will tell, at some distance, whether there be any twites mixed among linnets. The twite is supposed to breed in the more northern parts of our island.

THE SKYLARK.

The tuneful lark, who from his nest
 Ere yet well-fledged is stol'n away,
 With care attended, and carest,
 Will sometimes sing the livelong day:
 Yet still his native field he mourns,
 His gaoler hates, his kindness scorns,
 For freedom pants, for freedom burns.
 That darling freedom once obtain'd,
 Unskill'd, untaught to search for prey,
 He mourns the liberty he gain'd,
 And hungry pines his hours away.
 Helpless the little wand'rer flies,
 Then homeward turns his longing eyes,
 And, warbling out his grief, he dies.

OF the lark family there are several species, but we shall only particularize two; the skylark and the wood-lark.

The skylark commonly forms its nest between two clods of earth, and lines it with dried grass and roots. In this she lays four or five eggs, and her period of incubation is about a fortnight, which office she generally performs twice a-year. Her maternal affection is extremely interesting, both to the eye and to the heart. When her young are callow, she may be seen fluttering over their heads, directing their motions, anticipating their wants, and guarding them against the approach of danger.*

* This instinctive attachment of the female skylark, often precedes the period when she is capable of being a mother. "A young hen bird (says Buffon) was brought to me in the month of May, which was not able to feed without assistance. I caused her to be reared; and she was hardly fledged, when I received from another place a nest of three or four callow skylarks. To these strangers she contracted a strong liking; she attended them

Early in the new year the lark begins to sing, and continues her melody during the whole of the summer. Chiefly, however, in the morning and evening its strains are heard, and as it chaunts its mellow notes on the wing, it is the peculiar favourite of every person who relishes the beauties of nature, at these tranquil seasons of the day.

Up springs the lark,
 Shrill-voic'd and loud, the messenger of morn,
 Ere yet the shadows fly, he, mounted, sings
 Amid the dawning clouds, and from their haunts
 Calls up the tuneful nations.

The lark mounts almost perpendicularly, and by successive springs, into the air, frequently hovering over its nest, and the objects of its dearest affections, at a vast height, without once losing sight of them. Its descent is in an oblique direction, unless when alarmed or attracted by its mate, when it drops to the earth like a stone. When it begins to rise, its notes are feeble and interrupted; but as it ascends they gradually swell to their full tone, and delight every ear enamoured of this feathered songster.

For nearly three months before Christmas, larks lose their voice, assemble in flocks, grow fat, and are caught in prodigious numbers. Four thousand dozen have been taken in the vicinity of Dunstable, between September and February; nor are they less an object of pursuit in other districts; so that it is a matter of wonder the species remain without apparent diminution. In Germany, such quantities of larks are caught, that they are subjected to an excise duty, which, accord-

night and day, though nearly as old as herself, cherished them beneath her wings, and fed them with her bill. Nothing could interrupt her tender offices. If the objects of her regard were torn from her, she flew back to them as soon as she was liberated, and disdained to think of effecting her own escape, which she had frequent opportunities of doing, while they remained in confinement. Her affection seemed to deprive her of every concern for self-preservation; she neglected food and drink, and though now supplied the same as her adopted offspring, she expired at last, quite worn out with maternal solicitude. None of the young ones long survived her, but died one after another; so essential were her cares, which were equally tender and judicious to their preservation."



THE SKY LARK

ing to Keysler, produces annually to the city of Leipsic, without noticing other places, a sum of about 900*l.* sterling.

THE WOODLARK,

————— The thrush
And woodlark, o'er the contending throng
Superior heard, run thro' the sweetest length
Of notes.

Is smaller than the skylark, also shorter and thicker; its colours are more pale, and its note, though equally sweet, is less sonorous. By some its song is preferred to that of the nightingale; and, during the months of May and June, it is often mistaken for that celebrated songster, particularly when the female is performing the office of incubation. It perches on trees, and whistles like a blackbird, while the skylark always sits on the ground. Like the latter, however, it sings as it flies, and sometimes also exerts its musical faculties in the night.

The woodlark builds on the ground, and lays four eggs. The young are extremely tender, and with difficulty reared, and therefore should not be removed from the nest till well fledged. In a state of nature, the woodlark feeds on beetles, caterpillars, and other insects. Apparently conscious of the melody of its own song, no art can bring it to imitate any other bird, unless taken very early from the parent nest, when it occasionally varies its native strains.

THE WAGTAIL.

THIS lively and active bird, which receives its appellation from the motion of its tail, gives a constant animation to the scene. It frequents the sides of ponds and small streams, in search of worms and insects; and in the spring and autumn is a regular attendant on the plough, for the sake of the worms thereby disclosed.

The head, back, and part of the neck, as far as the breast, are black; in some the chin is white, and the throat marked with a black crescent; the breast and belly are white; the quill-feathers are dusky; the coverts black, tipped and edged with white. These birds make their nest on the ground, of dry grass, fine fibres

of roots, and moss, lined within with hairs or feathers, and lay five white eggs, spotted with brown; and there is only one brood in a year.*

THE NIGHTINGALE.

———Listening Philomela deigns
To let them joy, and purposes, in thought
Elate, to make her night excel their day.

FROM the earliest ages, poets have adorned their lays with descriptions of the vocal powers of this incomparable musician; and the admirers of sweet and varied modulations have listened to its notes with rapture. A bird thus universally celebrated, must unquestionably possess merits of no common order, and this is really the case. It is the song of the nightingale, and the season of its rehearsal, which give it such distinguished pre-eminence; its colours are neither beautiful nor rich, but it is often admired without being seen. The upper part of the body is of a rusty brown, tinged with olive; the under parts are of a pale ash colour, almost white under the throat and belly; and its whole length does not exceed six inches.

The nightingale visits England about the middle of April, and takes its departure again, for the distant regions of Asia, as it is supposed, about the middle of August. It never migrates so far north as Scotland, or west as Cornwall and Wales. Even in districts where it is found, it seems to confine itself to particular spots, probably influenced by security, or the abundance of food. But though the climate of Sweden is more severe than that of any part of the British islands, Linnæus informs us that it is not unknown in that country.

In England, nightingales frequent thick hedges, and low coppices, and generally conceal themselves in the

* The greater part, however, of these birds disappear in autumn, but it is not known, with any degree of certainty, how they dispose of themselves. In fine weather, even in the middle of winter, they make their appearance, chirping briskly, and seeming to enjoy the warmth of the sun; yet their retreat, during more inclement days, has not been ascertained, though it cannot possibly be very remote. This is one of the mysteries of nature, which may exercise ingenuity, but which we may not, in every case, be able to comprehend or explain.



THE NIGHTINGALE

middle of some leafy bush. They commence their song in the evening, and continue it through the night. Perhaps part of its fame, and certainly much of its effect, are owing to this circumstance. During the solemn stillness of the night, when other animals are at rest, every sound is heard to advantage, and produces a deeper impression. These vigils did not escape the notice of the Mantuan bard, who thus describes them:

As Philomel in poplar shades, alone,
For her lost offspring pours a mother's moan:
Which some rough ploughman marking for his prey,
From the warm nest, unfledg'd, hath dragg'd away;
Perch'd on a bough, she all night long complains,
And fills the grove with sad repeated strains.

But, independent of all combinations of time and place, so various, sweet, and continuous, are the notes of this bird, that, in comparison, the songs of other warblers, in their utmost extent, are insignificant. His variety appears inexhaustible; he never repeats the same note twice, without some change of key or embellishment. As often, indeed, as this leader of the feathered choir prepares to conduct the hymn of nature, he begins by feeble, timid, and indecisive tones, as if to try his instrument. By degrees he assumes more confidence, becomes gradually more warm and animated, till he captivates and overwhelms his audience, with the full exertion of his astonishing powers.*

The nightingale is small, and apparently weak, its voice may be heard almost a mile round his retreat. When tamed, he sings about nine months in the year, a proof that he is not solely prompted by love or duty, but by a natural instinct for melody. In a state of nature, however, he seldom sings above ten weeks in the year, and before he leaves off, his voice becomes more like the croaking of a frog than that of the tuneful Philomel we have described.

Nightingales may be taught to adopt the notes of

* Pliny has given an admirable description of these qualities of the nightingale, in recording the spirit of emulation which it displays in its song. Two of them, he observes, will continue to carry on an obstinate contest for victory, till the vanquished bird drops lifeless on the ground.

any other bird, to sing by turns with a chorus, and to repeat their couplet at a proper time. A Cornish gentleman informed Mr. Bingley, that he had remarked of the nightingale, that it could modulate its voice to any given key, and that when a person whistled to it, the bird would immediately try to fall into unison. It may be even taught to articulate words. According to Pliny, the sons of the Emperor Claudius had some nightingales which spoke Greek and Latin. But what he subjoins is perfectly incredible, namely, that these birds prepared every day new expressions, with which they entertained their masters. Gesner, however, was determined to outdo the Roman naturalist in credulity. He quotes a letter from a person of credit, as he states, who mentions two nightingales belonging to an inn-keeper at Ratisbon, which passed the night in discoursing, in German, on the political interests of Europe; on the events that had already happened, and on those that might be expected, and which actually took place in the sequel.

Nightingales are solitary birds, never associating in flocks, but hiding themselves from the public eye. The London bird-catchers, however, will sometimes take ten or a dozen of them in a day, by a net-trap, baited with a meal-worm.

THE PETTICHAPS

Is less than a linnet. The bill is short, the upper mandible black, the under blueish; above and below the eye is a yellowish line; the head, neck, and upper parts are of greenish ash-colour; the belly is of a silvery white; the breast darker, and tinged with yellow; the legs are blueish or lead-coloured. It makes a nest of an arched form, composed of dry bents, with a little moss, and lined with feathers, on the ground, under a tuft of grass, or at the bottom of a bush. The eggs are five in number, white, sprinkled all over with small red spots, most so at the largest end. In Dorsetshire it is called the hay-bird. In Yorkshire the beam-bird.

THE BLACKCAP

Is smaller than the pettichaps. The bill is brown; the top of the head is black; and the upper parts of the



THE REDSTART

body are of a greenish ash-colour; the sides of the head and under parts are grey; legs lead-coloured, and the claws black. This bird is pretty common in England, and elsewhere in Europe, as far as Italy; in all which places it breeds. In Italy twice in the year; with us only once. The nest, generally placed in some low bush, is composed of dried stalks, mixed with a little wool and green moss round the verge; the inside lined with the fibres of roots, thinly covered with black horse-hair. The eggs are five in number, of a pale reddish brown, mottled with a deeper colour, and sprinkled with a few dark spots. The male and female sit by turns during incubation; and if any one approaches, the young very early leap out of the nest, and forsake it for ever. Their food is chiefly insects; but, in defect of these, they will eat the fruits of spurge-laurel, service, and ivy, and seem fond of the last, as they much frequent trees overgrown with it. The song is much esteemed, and in many things almost equalling the nightingale's itself; deficient only in the compass and delightful variety of note. Hence by many it has been named the mock-nightingale.

THE HEDGE-SPARROW,

A WELL-KNOWN bird, has the back and wing-coverts of a dusky hue, edged with reddish brown; rump of a greenish brown; throat and breast of a dull ash-colour; the belly a dirty white, and the legs of a dull flesh-colour. This bird makes its nest of moss and wool, lining it with hair, and lays four or five eggs, of a fine pale blue. With us and the more northern regions it is seen at all seasons; but in France it is migratory, coming in October and departing northward in spring. The note of this bird would be thought pleasant, did it not remind us of the approach of winter; beginning with the first frosts, and continuing till a little time in spring. Its often repeating the words tit, tit, tit, has occasioned its being called "Titling" in many places.

THE REDSTART

Is somewhat less though longer than the redbreast; the forehead is white, the crown of the head, hind part of the neck, and back, are deep blue grey; the cheeks and

throat black; the breast, rump, and sides, red, and the belly is white; the two middle tail-feathers are brown; the rest red, and the legs are black. The female has the top of the head and back cinereous grey, chin white. The same parts are red in this sex as in the male, but not so bright. The wings are brown in both sexes. The redstart appears in the spring, along with other summer birds, and is seen perched on towers, ridges of houses, and the highest and most inaccessible pinnacles. It is found also in the most impenetrable recesses of the woods, where it indulges, undisturbed, its solitary habits, and utters its plaintive notes. It builds its nest chiefly of moss, lined with feathers, in either the holes of walls, the hollows of trees, or in the cliffs of rocks. It has been known also to occupy an old pigeon-box, fixed up against the wall of a house, or any other secure retreat. Hence it is not so shy as many birds in respect to itself; for it approaches habitations, and frequently makes its nest in some hole of a wall, where numbers of people pass by frequently; yet it is content, if no one meddles with the nest; for the least derangement of the eggs, or almost looking at them, especially if the female is disturbed thereby, causes her to forsake the nest altogether. The eggs are blue, and four or five in number. This bird frequently wags its tail; but does it sideways, like a dog when he is pleased, and not up and down like the wagtail. It is with difficulty that these birds are kept in a cage; nor will they submit to it by any means if caught old.

While the female is employed in the business of incubation and rearing her young, the male is commonly stationed on the loftiest object in the vicinity, where he runs through the modulations of his voice for a long time together.

In point of execution, the redstart is far inferior to the nightingale; yet his notes are tender, plaintive, affecting, and expressive of soft emotions. If taken young, it will acquire some degree of familiarity; otherwise, though frequently a near neighbour to man, it continues wild and timid. It comes and goes to its nest without seeming to notice mankind, or at least without paying them any tribute, except that of fear. It never acquires the intimacy and confidence which distinguish



THE ROBIN



the redbreast, nor has it any of the gaiety of the lark, or the emulation of the nightingale. In a word, its dispositions are melancholy, and its manners wild. When taken, after it arrives at maturity, it refuses every kind of food, and prefers death to captivity.

THE SEDGE-BIRD

Is about the size of the black-cap, but more slender. The head is brown, marked with dusky streaks; a white and a black line over each eye; the upper parts of the neck and back reddish brown; the breast and belly have a yellow tinge; the tail is brown, much rounded, and the legs are dusky. This bird frequents places where reeds and sedges grow, among which it makes its nest, (though it has been known to do this on the lowest branches of trees,) of straw and dried fibres of plants, lined with hair; the female lays five eggs, of a dirty white, marbled with brown. The male imitates the note of the swallow, skylark, house-sparrow, and other birds, in a pleasing but hurrying manner, and sings all night.

THE REDBREAST.

PEOPLE of every nation of Europe have a prejudice in favour of the redbreast; which in Britain is not a little cherished and kept alive by the popular ballad of the "Children in the Wood," who, it is said, were, after death, carefully covered with leaves by the robin redbreast.

Of this beautiful and lively bird, little description can be wanting; the upper parts are of a greenish ash-colour; the forehead, throat, neck, and breast, a rufous orange; the belly and vent whitish; the bill, legs, and sides of the body, dusky. It is a constant inhabitant of these kingdoms; is familiar to the eyes of every person, and it is interesting to the affections from its domestic habits, and the confidence it reposes in man. It is reckoned among birds of passage, but its departure in autumn is seldom noticed, as many remain behind, and cheer us with their song, when other warblers become mute.

At the approach of winter the redbreast visits our dwellings, and seeks the warmest and most sheltered situations. Those which continue in the woods, will

be attached to the faggot-maker, flutter round him, chirp each its slender pipe, and cherishing itself at his fire. As the cold becomes more severe, and snow covers the ground, it boldly taps at our windows with its bill, and, if admitted, picks up crumbs of bread, distinguishes affectionately the people of the house, and repays their protection, with its pleasing but delicate voice. This it retains through all the rigours of the season, to hail each day the kindness of its benefactors, and the sweetness of its retreat. As spring advances, it is inspired with other sensations, and resumes its native independence.

The poet of nature has thus beautifully described the annual visits of the robin :

The redbreast, sacred to the household gods,
Wisely regardful of th' embroiling sky,
In joyless fields and thorny thickets leaves
His shivering mates, and pays to trusted man
His annual visit. Half afraid, he first
Against the window beats; then brisk alights
On the warm hearth; then hopping o'er the floor,
Eyes all the smiling family askance,
And pecks, and starts, and wonders where he is;
Till, more familiar grown, the table crumbs
Attract his slender feet.

The female generally builds her nest of dried leaves, mixed with hair and moss, and lined with feathers, in some out-house, old building, or concealed spot by the roots of trees, and lays from five to seven eggs, of a dusky white, with reddish spots. It feeds on worms and insects during summer, but its food may be said to vary with the season, for nothing comes amiss to it, that is capable of supporting life. The young, when full-feathered, may be taken for a different bird, being spotted all over. The first rudiments of the red break forth on the breast about the end of August; but it is quite the end of September before they come to the full colour. No bird is so tame and familiar as this; closely attending the heels of the gardener when he is using his spade, for the sake of worms; and frequently in winter entering houses where windows are open, when they will pick up the crumbs from the table in presence of the family.



THE WREN

THE STONE-CHATTER

Is in length about four inches and three-quarters. The upper parts of the body blackish and pale rufous; on the neck a transverse white streak, the breast reddish yellow, the belly paler, and legs black. The female has less vivid colours. This bird inhabits dry places, as heaths and commons; living on insects. It makes its nest early, at the foot of some low bush, or under a stone; and lays five or six eggs of a blueish green, with faint rufous spots. It is very crafty, never betraying the place of the nest, but alighting at some distance, and creeping to it by stealth. It is a restless bird, incessantly flying from bush to bush; and has its English name from its note, resembling the clicking of two stones together.

THE WHIN-CHAT

Is larger than the stone-chatter. The upper parts are blackish, edged with rufous; from the bill a streak of white passes over each eye to the hind head; the cheeks are blackish, the chin and under parts rufous white; on the wing is a transverse white mark. The female is paler, the spots on the wings and the white trace over the eye less conspicuous. This is not uncommon, and is with the stone-chatter seen on the heaths during the summer months; where it breeds, making the nest much like that bird. It lays five dirty white eggs, dotted with black. Its food is chiefly insects, and its flesh is delicate when in good condition.

THE WREN.

OF this bird we have three species, the common wren, the willow wren, and the golden-crested. The latter is the smallest of British birds, weighing about twenty-six grains. The bill is very slender, of a dusky brown colour; the head, neck, and back reddish brown; over each eye is a whitish streak; the under parts to the breast are whitish; the rest is inclined to brown, crossed with brown lines; the legs are pale brown.

The common wren, which is about four inches and a half long, and weighs only three drachms,* frequents

* Ray justly observes, that it is one of those daily miracles which escape our observation, that a wren should produce and

farm-houses and country villages, hopping about full of vivacity, even in the depth of winter, and towards evening expressing its satisfaction, by cheerful well-toned notes. It is frequently seen on stacks of fire-wood, or by the sides of old walls, into the holes of which it retreats like a mouse. It remains not, however, long concealed; but again appears, making quick and inconstant movements with its tail, which is always raised, nearly perpendicular. Its flights are short but full of celerity, its wings moving with peculiar rapidity. The female, twice a-year, builds a curious nest of an oval shape, very deep, with a small aperture, the external part chiefly moss, the internal hair and feathers. She lays from ten to eighteen white eggs, with pale red spots.

The wren, notwithstanding its diminutive size, is one of the finest of our singing-birds; and an additional claim to our regard is its remaining with us all the year, and continuing its melody through the winter, except in extremely severe frosts. It is almost the only feathered songster that continues warbling when the general silence of the woods and groves is interrupted merely by the croaking of ravens and the cawing of rooks. During a fall of snow it exerts itself with peculiar effect, and always sings very late in the evening, though never after dark.

THE WHEAT-EAR

Is five inches and a half long. The top of the head, part of the neck, and back, are blueish grey; a white streak over the eye; the under parts yellowish white; pure white at the vent; the breast tinged with red; and the legs black. It visits England annually in the middle of March, and leaves in September. It chiefly frequents heaths. The nest is usually under shelter of some turf or stone, always on the ground, and frequently in some deserted rabbit-burrow. It is composed of dry-grass or moss, mixed with wool, fur of the rabbit, &c. lined with hair and feathers. The eggs are from five to eight, of a light blue, with a deeper blue

regularly feed so many young, in total darkness. They may be easily reared, if taken from the nest at fourteen days old, and fed with minced flesh.

circle at the large end. The young are hatched in May. In some parts these birds are in vast plenty.—About Eastbourn, in Sussex, they are taken in horse-hair snares, placed beneath a long turf; being very timid birds, the motion of a cloud, or the appearance of an hawk, will drive them for shelter into these traps, and so they are taken. The numbers annually ensnared in that district alone amount to near 2,000 dozen, which usually sell at sixpence per dozen. Quantities are eaten on the spot by the neighbouring inhabitants; others are picked and sent to the London poulterers; and many are potted, being as much esteemed in England, as the ortolan on the continent. Their food is insects only; though in rainy summers they feed much on earth-worms, whence they are fattest in such seasons.

LECTURE LXVII.

THE CHIMNEY-SWALLOW.

Swallow! that on rapid wing
Sweep'st along in sportive ring,
Now here, now there, now low, now high,
Chasing keen the painted fly;—
Could I skim away with thee
Over land, and over sea,
What streams would flow, what cities rise,
What landscapes dance before mine eyes.

OF all the feathered tribes, the swallow kind are most incessant on the wing. Flight, indeed, seems their natural and almost necessary attitude; but what must ever render them interesting is, their service to mankind, by destroying myriads of insects, which would otherwise prey on the labours of industry; and the deep veil thrown over their annual appearance and disappearance at nearly stated periods, without our being able to ascertain where they retire, or how they dispose of themselves while absent from us.*

* On this subject there are three different opinions, each of which has its supporters; namely, that they emigrate to warmer

The common or chimney-swallow is distinguished from all others by its very much forked tail, and red spot on the forehead and under the chin. The crown of the head, whole upper part of the body, and coverts of the wings, are black, glossed with a rich violet blue, most resplendent in the male; the breast and belly white, and in the male tinged with red; the tail black, the two middle feathers plain, the others marked transversely near their ends with a white spot; the exterior feathers of the tail much longer in the male than in the female.

It generally appears in this country about the middle of April, and, after a few weeks, begins building its nest in the insides of our chimnies, generally a few feet from the top. It lays four or five eggs, and has two broods every year, the second about the middle of August.*

climates; that they lie torpid in caves, or other secure retreats; and, that they plunge into the mud of ponds and lakes, where they continue, in a state of insensibility, till the return of spring, and the consequent reproduction of their insect food. The first opinion is most prevalent; the second is not without support from experience and observation; and the third, though wild and unnatural, has been defended with zeal.

* The progressive steps by which the parent birds introduce their young into active life, are worthy of notice, as an admirable display of instinct. They first, with some difficulty, raise them from the nest to the top of the chimney; there they feed them for a day or two, and when they have acquired sufficient strength to make another remove, they are conducted to the bough of some leafless tree, where, sitting in a row, they are attended with great assiduity. In a few days more they are strong enough to fly, but are still incapable of catching their own food. They, therefore, play near the place where the dam is watching for flies, and when she has collected a mouthful, at a certain signal the mother and nestlings advance, rising towards each other, and meeting at an angle, the young in the meanwhile uttering a short quick note of gratitude and complacency.

The swallow acts as a centinel to other birds of the family, particularly to martins; for no sooner does it perceive the approach of a bird of prey, than it calls with a shrill alarming note all its own fellows and the martins about it, who pursue the enemy in a body, and buffet and harass him, till he retires from the spot they hold dear. This bird will also sound the alarm, and strike at cats, when they venture on the roofs of houses, in the vicinity of a nest.

But not always in chimnies does the swallow build. It has been known to form its nest on the frame of an old picture, on the handles of a pair of garden-shears, on the back of a dead owl,

THE MARTIN

Is inferior in size to the chimney-swallow, and its tail much less forked. The head and upper part of the body, except the rump, are black, glossed with blue; the breast, belly, and rump are white; the feet are covered with a short white down; it begins to repair its old, or to build a new nest, generally under the eaves of houses, against which it sticks a conical fabric of mud and straw, with an aperture near the top, capable of long resisting the effects of the weather.—In this nest are produced four or five young, which, when full grown, become impatient of confinement, and sit all day with their heads peeping out at the orifice,

suspended from the rafter of a barn, and even in a shell fixed in a proper situation to allure it. An owl, with the nest on its wings, and with eggs in the nest, was among the curiosities in the museum of the late Sir Ashton Lever.

All the tribe drink as they fly, sipping the surface of the water; but the swallow alone washes on the wing, by dropping often into a pool successively. The common swallow feeds on small beetles, as well as on gnats and flies, and frequently picks up gravel, to assist in grinding and digesting its food. Horsemen, on wide downs, are often closely attended, for miles together, by a small party of swallows, playing before and behind them, for the sake of the insects raised by the trampling of the horses' feet. Indeed, the number of insects destroyed in the course of a summer, by every single brood of swallows, renders these birds the guardians of our corn, and entitle them to the same regard, which, in Egypt, defends the Ibis, and in Holland the stork. Certainly, we hear oftener of unproductive harvests on the continent than in Britain; which may be ascribed to a scarcity of swallows; as in the markets of Spain, France, and Italy, they are sold for food. In England we need not such resources for our tables; and only the wanton and the cruel shoot swallows; to the dissatisfaction of every thinking mind. In addition to the inhumanity of starving whole broods by killing the dam, those persons who follow this barbarous amusement, ought to reflect, that each massacre of a swallow aids the effects of blasts, mildews, and vermin, in causing a scarcity of bread.

According to White's most accurate observations, swallows, before they disappear, forsake houses and chimnies, and roost in trees. They usually withdraw from public notice about the beginning of October, though some stragglers may be seen a month longer. Before their actual disappearance, they assemble in vast flocks on house-tops, churches, and trees, whence they take their flight.

where the dam supplies them with food, till they are able to take wing; and they are for some time longer fed as they fly, but with such a rapid movement, that the quickest eye cannot discern the whole process.

No sooner, however, is the first brood able to provide for themselves, than the parent birds prepare their nests for a second, while the excluded young congregate, and may be seen on sunny mornings and evenings, clustering and hovering round towers and steeples, and on the roofs of churches and houses. These assemblies usually commence about the first week in August, and continue till the family disappear.

The martin is often capricious in fixing on a nesting-place, beginning many edifices and leaving them unfinished; but when it has once found a suitable situation, and formed a nest, it will occupy it for several successive years, and though it be demolished by accident or design, the bird will build again on the same foundation, nor can it be easily driven away.

This species is the least agile of the tribe; their wings and tails being short, they are incapable of those astonishing turns and quick evolutions, which distinguish the chimney-swallow. Their general motion is placid and easy in the middle region of the air, neither mounting to any great height, nor skimming long on the surface of the earth.

As the summer declines, the flocks of martins daily encrease, from the accession of the second broods, till they swarm in myriads near the banks of rivers and lakes. In the beginning of October, the greater part disappear, though some have been seen in the first week of November. Vast numbers are annually destroyed, the numbers appearing in the spring bearing no proportion to those which retired the preceding year.*

* The spirit of encroachment, among birds, provokes enmity as among men. A gentleman in North America, one morning heard a noise from a couple of martins flying from tree to tree near his dwelling. They attempted often to get into a box fixed against the house, which they had formerly occupied. On particularly observing their motions, it was noticed that a small wren came from the box, and perched on a neighbouring tree, making a very shrill noise; she soon, however, flew away, and the martins took possession of the box; but, in a short time, returning, she

THE SAND-MARTIN

Is four inches and three quarters in length, with the whole upper parts of the body of a mouse-colour, the throat and under parts white, the bill and legs blackish. It appears in this country soon after the swallow; but the species is less numerous, and diffused. It frequents the banks of rivers and sand-pits, where it perforates a hole for its nest, about two feet in depth, but with a horizontal serpentine sweep, carrying on the business of nidification, incubation, and the support of its young, in the dark; it would not be easy to ascertain the time of breeding, were it not for the coming forth of the broods, which appear much about the time, or rather somewhat earlier, than those of the swallow. The nestlings are supported in common, like those of their congeners, with gnats and other small insects; and sometimes they are fed with *libellulæ* (dragon-flies) almost as long as themselves; and, at the inner end it constructs a rude nest of grass and feathers, laying from four to six eggs.*

obliged them to decamp. This manoeuvring continued the whole day, but, next morning, the wren quitting her lodging, the martins immediately occupied it, and with extreme industry and ingenuity soon barricaded the entrance. The wren again presented herself, but could not procure admission; and the martins, by abstaining from food, and maintaining their post for two days, obliged the invader to raise the siege, and leave them in quiet possession of the nest.

* Though one would at first be disinclined to believe (says Mr. White), that this weak bird, with her soft tender bill and claws, should ever be able to bore the stubborn sand-bank, without entirely disabling herself, yet, with these feeble instruments, have I seen a pair make great dispatch, and could remark how much they had scooped in a day, by the fresh sand which ran down the bank, and was of a different colour from what lay loose, and had been bleached in the sun. In what space of time these little artists are able to mine and finish their cavities, I have not been able to discover, but it is worthy of observation, where it falls in the way of any naturalist to make such remarks. This I have often noticed, that several holes of different depths are left unfinished at the end of the summer. To imagine these beginnings intentionally made, to be in greater forwardness for the returning spring, is allowing perhaps too much foresight to a simple bird. May not the cause of these being left unfinished arise from the bird's meeting with strata too hard and solid for their purpose, which they relinquish

The facility with which sand-martins work is really astonishing. The earl of Warwick having cut a new approach to his castle through a gritty rock, to the depth of nearly twenty feet, the next year several birds of this kind formed their nests in particular veins of the bank on either side, and appeared as much at ease as if they had been denizens of the spot.

These birds are not of a very sociable disposition. Though they build together on account of the situation, they never congregate in autumn. They flit about with the irregular motions of a butterfly, and are peculiar in all their habits.

THE SWIFT.

THIS species of swallow, called also the black-martin, is by far the largest of the family, being near eight inches long, with an extent of wing near eighteen inches, though the weight of the bird is only one ounce. Its feet, however, are so small, that it appears to use them with difficulty : but nature has amply provided it with the requisites of flight, and therefore it spends most of its time on the wing. The swift visits us latest, and leaves us the earliest, of any of the tribe, appearing about the beginning of May, and retiring about the middle of August. It breeds under the eaves of houses, in steeples, and other lofty buildings, forming its nest of grass and feathers. It breeds only once in the season, and produces no more than two at a time.

The activity of these birds is astonishing. In the height of summer, they will daily continue sixteen hours on the wing ; and, in sultry louring weather, display unusual energy and alertness. In hot mornings, they collect in little parties, and dash round the edifices they frequent, with very clamorous notes. These are supposed to be the males ; for the hens sit all day on the nest, and only snatch a few minutes before night sets in to supply the wants of nature, and relieve their weary limbs.

and go to a fresh spot that works more freely. One thing is remarkable, after some years the old holes are forsaken, and new ones bored ; perhaps, because the former habitations were become foul and foetid from long use, or because they abounded with fleas, (which pester this species to a great degree,) as to become untenable."

Just before they retire, large groupes assemble high in the air, screaming and shooting about with wonderful rapidity. Indeed, they feed and fly higher than any other species; they also range to vast distances, as flight to them is merely pastime. Sometimes, however, they may be observed for hours together hawking very low, over pools and streams, in search of cadew-flies, may-flies, and dragon-flies. They will even pursue and strike at birds of prey sailing about in the air; but though their powers are greater, they express less animosity on such occasions than the other branches of their family.

The early retreat of the swift is wholly unaccountable; scarcely a straggler is to be seen on the 20th of August, (though on September 3, 1782, one was seen at Lyndon, in Rutlandshire;) and what is more extraordinary, they disappear even sooner in the most southerly parts of Andalusia, where a defect of food or of heat cannot be supposed to influence their motions. It is therefore probable that they all lie torpid in the country that produces them; and, in confirmation of this opinion, we learn from good authority, that in February, 1766, a pair of swifts were found adhering by their claws, and in a torpid state, under the roof of Longnor Chapel, in Shropshire, both which revived on being brought to the fire.

THE GOATSUCKER

Is black, varied with ash-colour, brown, ferruginous, and white; and is less than the martin. This curious bird, more frequently heard than seen, is nearly allied to the hirundines, and may properly be called a nocturnal swallow; for so great is the sensibility of its organs of sight, that it seldom appears by day, and seems to have enjoyment only under an obscure sky. This bird stays but a short time in Britain, appearing about the end of May, and departing about the middle of August. It feeds on night insects, which abound while it continues with us; and, to catch them with more certainty, it flies with its mouth open, nature having furnished it with a glutinous substance to prevent their escape. From thus flying with its mouth open, arises the continual buzzing noise it makes while chasing its prey

When it settles on any small building, its notes will give a sensible vibration to the whole fabric. It occasionally emits four or five times a kind of squeak, which seems the voice of dalliance with its mate. The female makes a very artless nest in the ground, and lays two eggs. Should her young be discovered, it is said she will roll them with her wings to some more secret place.

THE HERON.

THE heron is one of those birds that connect the land with the water tribes, and belongs to the natural family of waders, which all agree in their manner of life—a state rendered miserable by toil and hunger. The very appearance of the heron, indeed, presents the image of suffering, anxiety, and indigence. It appears thin and cadaverous, and if it occasionally feasts like a glutton, it frequently performs the penance of a long fast. Probably, nature has endowed it with the powers of supporting extreme abstinence, when there is a scarcity of food; as well as giving it a most voracious appetite, when supplies are procurable.

The heron, which measures upwards of three feet in length, is pretty common in Britain. The feathers of the head are long, and form an elegant crest on the male, but the female is destitute of this appendage. The legs are long, and the prevailing colour of the plumage is a blue grey,

Of all known birds, the heron is the most formidable enemy to the scaly tribes. In fresh water, there is scarcely a fish, however large, but it will strike at and wound, though unable to carry it off; but small fry are its chief subsistence, which, by their more powerful fellows of the deep, pursued into shallow waters, find there a more formidable foe in the heron, which devours them without mercy. He generally wades as far as he can into the water, and there patiently waits the approach of his prey, at which, as soon as it is within his reach, he darts his long bill with unerring aim. Willoughby says, he has seen a heron with seventeen carps in his belly at once; which, if undisturbed, he would digest in six or seven hours, and then resume his vocation of fishing; and, that he had seen a carp taken out of a heron's belly, nine inches and a half long. Some gen-

tllemen who have kept tame herons to try what number one of them would eat in a day, have put several roach and dace in a tub ; and they have found him consume fifty, one day with another.

Though this bird usually catches his prey by wading into the water, he will sometimes seize it on the wing in shallow streams, and pin it to the bottom. But no sooner has he laid firm hold of it, than he rises on the wing while it is yet struggling in his bill, and flying to the shore, swallows it whole, and then hastens to his former station.

But notwithstanding his size and powerful beak, the heron is constantly haunted with fear. He flies not only from man, but also from the smallest of the falcon tribes. When pursued by rapacious birds, he tries to escape by mounting aloft in the air ; and the struggle between him and his pursuers continues for the ascendant, till both are lost in the regions of the clouds. From this circumstance, herons were formerly birds of game, and hawking them was a favourite amusement of noblemen. Hence a penalty of twenty shillings was incurred by any person who destroyed their eggs. Their flesh, too, in former times, was esteemed in England, and valued at an equal rate with that of the peacock. In France it is still eaten, when young.

During the season of incubation, herons unite in societies, and build in the highest trees. Their nests are made of sticks, and lined with a few rushes and wool, or feathers. Each contains four or five eggs, of a pale green colour. When taken young, herons are easily tamed ; but when old they refuse all food in captivity, and die of hunger.

THE BITTERN.

THE head nearly smooth, body reddish-brown above, with transverse spots ; pale underneath, with oblong brownish spots. This bird, which belongs to the heron tribe, is distinguished from all others by its dismal hollow noise, somewhat resembling the interrupted bellowing of a bull, but more solemn and loud, and frequently heard at the distance of a mile. It is not, however, so large as the heron, and its bill is weaker. It has a kind of pendant crest, and the prevailing colour of

the plumage is a pale dull yellow, variously marked with black. It is a very solitary bird, and is chiefly found among the reeds and rushes of extensive marshes, equally hid from the fowler, and the prey for which it watches. It continues whole days about the same spot; and when it removes in autumn, it always commences its journey about sunset, that its motions may be concealed.

During summer it subsists chiefly on fish and frogs, but in autumn it resorts to the woods in search of mice, which it seizes dexterously, and swallows whole. When wounded, it often boldly resists both dogs and men; and when caught, it exhibits much rancour, striking viciously at the eyes of its antagonist. It is never the aggressor, except against its immediate prey; but if once attacked, it fights with the greatest intrepidity. Sometimes it turns on its back, and, like the rapacious birds, fights with both its bill and claws; and, in this posture, has been known to drive off the most determined dogs.

About February and March, its loud booming note may frequently be heard in the mornings and evenings, several times repeated; and, after an interval of silence, renewed. Though harsh and dissonant to us, this is its amorous call, produced by a loose membrane, at the divarication of the trachea, which can be distended with air, and exploded at pleasure. *

In April, the female builds her nest among rushes, and lays four or five eggs, on which she sits twenty-five days. After the young are excluded, the parent bird feeds them with snails, small fish, and frogs, for three weeks or a month, in which time they acquire sufficient strength to provide for themselves.

About the time of Henry VIII. the bittern was esteemed a delicious dish at the tables of the great. Its flesh has much the flavour of hare, and is not unpleasant. It therefore is the object of pursuit by the sports-

* This noise was formerly believed to be made from plunging its bill into a reed, or rather into the mud; hence Thomson says,

So that scarce
The bittern knows his time, with bill ingulph'd,
To shake the sounding marsh.

men, and of acquisition by the luxurious. The hind-claw was formerly considered as a grand preservative for the teeth, and was often set in silver, and used to pick them.

THE COMMON COOT

HAS a bald forehead, black body, and lobated toes; and is about fifteen inches long. This bird frequents lakes and still rivers; making its nest among the rushes, with grass, reeds, &c. floating on the water, so as to rise and fall with it. The female lays five or six large eggs, of a dirty whitish hue, sprinkled over with minute deep ferruginous spots; and sometimes she will lay fourteen or more eggs. The young when just hatched are very deformed, and the head mixed with a red coarse down. In winter they often repair to the sea; and the channel near Southampton is sometimes observed almost covered with them. They are often brought to that market, where they are exposed to sale without their feathers, and scalded like pigs. This species is not so numerous as might be expected; for we find that vast numbers fall a prey while young to the buzzards, which frequent the marshes. Their food is small fish and water-insects; but they sometimes eat the roots of the bulrush, and with it feed their young: they eat grain. This species is supposed to extend throughout the old continent, and perhaps the new also. The large coot is common in Lancashire, and the moorlands of Staffordshire.

THE WOODCOCK.

THE woodcock is a bird very generally diffused over the temperate and cold climates of the world. The length of the male is two feet nine inches, its weight sometimes fourteen ounces. The female is much less, the length being only twenty-six inches. The sexes differ also greatly in colours. The bill of the male is of a pale yellow; the head, neck, and back, elegantly marked with transversely slender lines of grey and black. The upper part of the breast is of a rich glossy green; the other parts of the breast and the belly black, mixed with some white feathers; the tail consists of eighteen feathers, black, marked on each side with a few white spots. The legs are very strong, and covered

with brown feathers ; the edges of the toes are pectinated. Of the female, the bill is dusky, the throat red, the head, neck, and back, are marked with transverse bars of red and black ; the breast has some white spots on it, and the lower part is of a plain orange colour ; the belly is barred with pale orange and black.

Those that visit us, during summer, are inhabitants of Norway, Sweden, Lapland, and other northern countries, where they breed ; but as soon as the frost sets in, retire southwards. They arrive in Great Britain in flocks, according to the mildness of the season, from October to December ; and, generally taking advantage of the night, make good their landing after sun-set, that they may have time to disperse before the return of morn. On their arrival, however, in bad and stormy weather, they are often so exhausted as to allow themselves to be seized by the hand, on their first touching the ground.

Woodcocks inhabit woody and mountainous countries ; in particular, forests of pines, birch-trees, and junipers ; feeding on the tops of the former, and the berries of the latter ; the first often infects the flesh with such a taste as to render it scarcely eatable. Woodcocks live on insects and worms, which they search for with their long bills, in soft and moist situations, particularly in the woods. They feed and fly chiefly in the night, and after satisfying the demands of nature, return to their usual retreats. In the spring the male calls the females to its haunts with a loud and shrill voice ; and is so very inattentive to its safety, as to be very easily shot. It stands perched on a tree, and descends to the females on their first appearance. They lay from eight to sixteen eggs ; eight at the first, and more as they advance in age.

After pairing, which takes place in February or March, the greater number of these birds migrate again to the north. They first approach the coasts, and if the wind be favourable, they immediately set out ; but when they are long detained by adverse gales, they fall an easy prey to sportsmen. The instant, however, a fair wind springs up, they seize the opportunity, and where hundreds have been seen one day, not a single bird could be found the next.

A few, probably unable to undertake the annual

journey, remain and breed in this island. These form their nests on the ground, generally at the root of some tree, and lay four or five grey eggs, marked with brown spots. During the period of incubation they are remarkably tame, and will submit to be stroked by the hand rather than desert their charge.

From the progress of cultivation, woodcocks are becoming more scarce in England; to the great concern of both the sportsman and the epicure. A woodcock, indeed, is a very delicate morsel, being always dressed with the intestines, which give an additional relish to the flesh; yet, in the north of Europe, the inhabitants esteem it unwholesome, from its being without crop. To the sportsman, who frequently enjoys destruction for its sake, rather than its produce, and therefore less excusable in the eyes of humanity, the woodcock furnishes a successive link to his pastime, after grouse and partridge shooting are past. It is generally raised from the woods and coppices, by spaniels trained purposely, when the bird, after clearing the tops of the bushes in a perpendicular direction, generally flies oblique and zig-zag, giving the gunner opportunity to use all his skill and address in taking aim.

Nearly allied to the woodcock is the snipe, which frequently breeds in the more northern districts of this island, though the species partly migrates. Its flesh, habits, manner of feeding, and the amusement it furnishes to sportsmen, bear a strong resemblance to the woodcock. It is much smaller and of a brown colour.

THE RUFF.

THIS bird is the most remarkable of the sand-piper genus. In Britain the female is called a reeve, and varies considerably in colour and size from the male, called RUFF, which is about twelve inches long, and so named from a series of long feathers standing out on the back of the head and neck, (like the ruff worn by our ancestors,) which is not acquired till the second year; and the female wholly wants it. The ruff is of as many different colours as there are males; but in general it is barred with black; the weight is six or seven ounces, the length one foot. Of the female, the common colour is brown,

the feathers very pale, the breast and belly white. Its weight is about four ounces.

These birds appear in the fens in the earliest spring, and disappear about Michaelmas. The reeves lay four eggs in a tuft of grass, the first week in May, and sit about a month. The eggs are white, marked with large rusty spots. The males appear most numerous, which occasions fierce contentions at the pairing season, for companions. A general battle commences as soon as a female arrives in sight ; and the fowler seizing the opportunity, frequently spreads his nets over the frantic combatants, and catches numbers of them.

They are birds of passage, though it is not known where they spend the winter. They arrive in the fens of Lincolnshire, and other places on the north coast, in great numbers. According to Pennant, above six dozen have been caught in a single morning in one net, and a fowler has been known to obtain, to his own share, forty or fifty dozen in a season. The flesh is much admired. They visit a place called Martin-Mere, in Lancashire, the latter end of March or beginning of April ; but do not continue there above three weeks, where they are taken in nets, and fattened for the table with bread and milk, hempseed, and sometimes boiled wheat ; but if expedition is required, sugar is added, which will make them in a fortnight's time a lump of fat : they then sell for two shilling or half-a-crown a-piece. They are dressed like the woodcock, with their intestines ; and when killed at the critical time, say the epicures, are the most delicious of all morsels.

THE LAPWING.

THIS beautiful and interesting bird, which in some counties obtains the appellation of PEEWIT, from the sound of its voice, during summer, is found in most parts of Europe, and is to be met with in Persia and Egypt ; but we cannot assert that it migrates from us to those countries. It generally appears in meadows and marshy grounds, in March, in some places so numerous, that the fields echo with its plaintive notes. The bill, crown of the head, crest, and throat, are a black colour ; there is also a black line under each eye ; the back is of purplish green, the wings and tail are black and white,

and the legs red; the weight is eight ounces, and the length thirteen inches. It has a beautiful tuft of feathers on the hind-part of the head, and its form and motions are alike elegant.

The lapwing has a singular method of collecting its food, which consists principally of worms. It observes the small swell of the ground which the worm makes, by employing itself in the morning. This it opens with its bill, and then beats the surrounding soil with its foot. By this motion, small as it may appear, the worm is brought to the surface, and instantly devoured by the vigilant bird. On the approach of night, it has still an easier mode of procuring its food; at that season, worms generally rise above-ground, when the lapwing, walking leisurely on the grass, feels and seizes its prey without exertion.

The female makes an inartificial nest of dry grass, in the vicinity of some pool or marsh. She lays four eggs, of an olive cast, spotted with black; and sets three weeks. The young are able to run about almost as soon as hatched, like chickens. To them the parent bird shews the tenderest attachment, and practices the most sagacious arts to allure boys or dogs from the spot where they are running. She does not wait the arrival of the danger she dreads, but boldly faces it, rising at once from the ground with a loud screaming, as if just flushed from hatching, though perhaps a hundred yards from the nest, and wheeling round and round with great clamour and apparent anxiety, till the object of alarm is allured to a sufficient distance. When the enemy is very near, she affects to be altogether unconcerned, and her cries cease in proportion as her fears are increased. When disturbed by dogs, she flies heavily before them, as if maimed; still vociferous, and still bold, but never looking towards the quarter where her young are stationed. The dogs pursue, in expectation of catching the parent every moment: but no sooner has she drawn them off, than she leaves her astonished pursuers to gaze at the rapidity of her flight.

Hence, around the head
Of wand'ring swains, the white-wing'd plover wheels
Her sounding flight; and then directly on,
In long excursion, skims the level lawn,
To tempt him from her nest.

The eggs are held in great esteem for their delicacy, and are sold by the London poulterers for three shillings the dozen. In winter, lapwings join in vast flocks, but at that season are very wild; their flesh is very good, their food being insects and worms. During October and November, they are taken in the fens in nets, in the same manner as ruffs, but are not preserved for fattening, being killed as soon as caught.*

THE KNOT

HAS the forehead, chin, and lower part of the neck brown, inclining to ash-colour; the back and scapulars deep brown, edged with ash-colour; the tail ash-coloured; and the toes, as a special mark, divided to the very bottom; the weight four ounces and a half. These birds, when fattened, are preferred to ruffs; and they are taken in nets in great numbers on the coasts of Lincolnshire, with two or three dozens of stales of wood painted like the birds, placed within; fourteen dozens have been taken at once. Their season is from the beginning of August to that of November. They disappear with the first frosts. Camden says, they derive their name from King Canute, Knute, or Knout, as he is sometimes called. Probably they were a favourite dish with that monarch. He kept the feast of the puri-

* The subsequent anecdote exhibits the domestic qualities of the lapwing, in an interesting light. A clergyman having put two lapwings into his garden, one of them died soon after, and the other continued to pick up such food as its inclosure supplied, till winter came on. Necessity soon drove it to seek provisions from the house, and being gradually familiarised with the servants who threw it something to eat, it at last ventured into the kitchen, the regular residence of a dog and cat. The good-will of these, however, it so entirely conciliated by its winning manner, that it constantly, at dark, resorted to the fire-side, and spent its evenings along with them, partaking the comforts of warmth. With returning spring it forsook its winter quarters, and betook itself to the garden; but when winter resumed its sway, it had recourse to its old shelter and friends, and met with a cordial reception. Satiety at length produced insolence, what was at first regarded as a favour, was in process of time snatched as a right. It frequently amused itself with washing in the bowl set for the dog to drink out of; and, while thus employed, shewed marked indignation if interrupted by either of its companions. At last this domestic bird died in this asylum, being choaked with something it had inadvertently picked up from the floor, and attempted in vain to swallow.

fication of the Virgin Mary with great pomp and magnificence at Ely; and this being one of the fen birds, it is likely he met with it there.

THE WILD SWAN.

THE wild, or whistling swan, is smaller than the tame species, from which it appears to be distinct. It is a native of the northern regions, appearing in England only before severe weather, when small flocks may be seen passing southwards. According to Martin, numbers of wild swans resort to Lingey, one of the Hebrides, about October, and continue there till March, when they migrate northwards to breed. A few remain all the year in Mainland, one of the Orkneys, and rear their young in the aits of the fresh-water lochs; but the principal part retire at the approach of spring. Their quitting the isle is said to presage fine weather, and their arrival the reverse; hence they have the appellation of the "Countryman's Almanack."

In Iceland, wild swans are an object of chase, particularly in the month of August, when incapable of flying from the loss of their feathers. At that season, the natives pursue them with dogs and horses, and catch vast numbers.

There are several specific differences between this and the tame swan; but one most remarkable is the singular form of the windpipe, which, falling into the chest, turns back like a trumpet, and afterwards makes a second bend to join the lungs. By which construction, the bird is enabled to utter a loud and shrill note, when flying or calling;* whereas the tame swan is the most silent of the feathered race, and only hisses when provoked.

* From this species the ancients derived their fable of the swan's possessing the powers of melody, and of singing its own requiem before its death. Besides, mute or tame swans never frequent the Po: and "I am certain, (says Pennant,) that it was never seen on the Cayster in Lydia," each of them celebrated by the poets as streams much resorted to by swans. In our day, the Icelanders compare its notes to the violin; they hear them at the end of a long and gloomy winter, the return of the swans announcing a more genial season; and fancy combining its voice with the spring, to which it is a prelude, finds in it a melody it would not otherwise possess.

THE TAME SWAN.

THIS species, always mute, is not always domesticated. It is found wild in Russia and Siberia, but more commonly, half reclaimed, in the temperate latitudes of Europe. They are principal ornaments of the artificial waters and lakes of our nobility and gentry, and are numerous on the Thames, being regarded as private property, and it is accounted felony to steal their eggs. In the reign of Edward IV. a person who did not possess a freehold of the clear yearly value of five marks, was prohibited from keeping a swan. The swan will not brook an intruder on its domain, and nothing can exceed the beauty and elegance with which this bird rows itself along, particularly before spectators, when it assumes the utmost grace and dignity.

Amid the reeds that fringe the lake,
Behold the swan with snowy wing,
Her innate pride of form awake,
And welcome love-creative spring.

On land, however, the swan has a very awkward appearance; its gait is peculiarly inelegant, and all its motions constrained; but in the water it will swim quicker than a man can walk; and it possesses strength sufficient to throw down and trample upon a person of ordinary stature, particularly if he exhibits any symptoms of fear. A single stroke from the wing of an old swan will break a man's leg; and a female, during the period of incubation, perceiving a fox swimming towards her from the opposite shore, instantly darted into the water, and having kept him at bay a considerable time with her wings, at last succeeded in drowning him; after which she returned in triumph to her nest, in the sight of several persons.*

All naturalists assign the swan great longevity, though this fact is not exactly ascertained. The period of three hundred years, allotted it by vulgar belief, is doubtless

* A few years ago a very fine one was drowned in Trentham pool, the seat of the Marquess of Stafford, by a pike striking at its bill. Each was of equal strength, and both swan and pike perished.

an exaggeration; but it appears extremely probable that it will live for a century. The flesh of the old birds is hard and ill-flavoured; but that of the young, called cygnets, was once highly esteemed, and is still used by the corporation of Norwich, at their public dinners; who are bound, by some tenure, annually to present the duke of Norfolk with an immense cygnet-pie.

Formerly, at Abbotsbury, in Dorsetshire, there was a noble swannery, the property of the earl of Ilchester, where upwards of six hundred were kept; but the collection is now diminished. When the royalty belonged to the abbot, before the dissolution of the monastery at that place, it was often more numerous than above stated.

In February, the female swan makes a nest of grass among the reeds, and lays eight or nine eggs, which she hatches for six weeks, and in two years the young attain their proper size and colours. For some months, they are protected and supplied with the tenderest care; but when they are able to provide for themselves, the old males drive them away. Thus expelled from their family, the cygnets unite in small companies, and only separate when they feel the calls of nature to rear families of their own.

LECTURE LXVIII.

THE GOOSE.

THIS island produces various species of geese; but the common wild goose, and the tame, are only varieties of the same species, though their different habits deserve consideration.

The *wild goose* is commonly found in the fens of this country; it breeds in Lincolnshire and Cambridgeshire, and produces seven or eight young at a time, which are easily domesticated, if taken early from the nest.*

* These birds are frequently seen flying at great heights, in flocks of from fifty to an hundred, particularly when the cold of

The *tame goose*, as has been already remarked, is this species in a reclaimed state. It is common round the farms and cottages of most parts of this country; but is most plentiful in Lincolnshire, where many thousands are kept for the sake of their quills and feathers.

Cruel and painful as the following practice undoubtedly is, yet it prevails, and these poor birds are stript alive once in the year for their quills, and five times for their feathers. The first plucking for both commences about Lady-day, and the other four take place between then and Michaelmas. When cold weather sets in immediately after this barbarous operation, numbers die in consequence; but independent of this, habit reconciles them to endure it with patience, if not without suffering. Old geese submit quietly to what they know from experience is unavoidable, but the young ones are noisy and turbulent. Pennant says, he once saw this business performed, and that even goslings of six weeks old did not escape, their tails being plucked, (as he was told) to inure them early to the custom. In other respects, the owners of the geese treat them with great attention and kindness, frequently lodging them in the same apartment with themselves.

These geese, which are obliged to submit to repeated pluckings, breed only once a-year; but such as are at liberty to wear their covering till nature divests them of it, and at the same time are well fed, generally hatch twice in a season. During the period of incubation, the Lincolnshire gooseherds take abundant care of their

the north forces them to seek a more southerly situation. In such expeditions, they seldom rest by day, and their cry is frequently heard when from their great height they are imperceptible. This is probably the note of mutual encouragement, as it is seldom exerted when they alight in their journies. Their flight is conducted with great regularity: they always proceed either in a line abreast, or in two lines joining in an angle in the centre. In this order, they generally take the lead by turns; the foremost, when tired, falling into the rear, and the next in rank succeeding to his duty. On the ground, too, they always arrange themselves in a line, and seem to descend for rest rather than for refreshment; at least we may presume so; for, after having continued in this situation an hour or two, one of them with a long loud note, gives the signal for the rest to rise, which is instantly obeyed with promptitude and alacrity.

charge, place them in rows in wicker pens one over the other, and drive them twice a-day to water. On their return, they replace each bird on her proper nest, without committing the smallest mistake; though a stranger would find it difficult to distinguish between one and another.

Both the goose and the gander shew a strong affection for their young, and will defend them with great resolution. Indeed, though simple in appearance, and awkward in gesture, this bird evinces many marks of sentiment and understanding.*

* It is even capable of gratitude and attachment to its benefactors, of which the following relation, communicated to Buffon by a person of veracity, gives ample proof.—The gentleman referred to, had two ganders and three geese. The two ganders, as is usual, were rivals; and one, distinguished by the name of Jacquot, being inferior in strength, was more than once in danger of his life from the fury of his adversary, had he not been saved by the active interference of his owner. The poor bird was so sensible of this, that he attached himself to his preserver with the utmost tenderness, seemed to claim his protection whenever he felt it to be wanted, and evinced so much gratitude, that we find it necessary to allow his master to speak in his own words, to give credit to the recital.—“When my friend Jacquot, (says he,) saw himself master of the three females, by the discomfiture of his rival, in which I assisted, he would not venture to leave them for a time, but only gave me at a distance many passing tokens of his friendship, by shouting and clapping his wings. Things went on in this way till the breeding season; and when his females began to sit, and he was no longer in fear of a rival, he redoubled his attentions to me. One day, having followed me as far as the ice-house at the top of the park, the spot where it was necessary to part with him, in pursuing my way to a wood at half a league distance, I shut him in the park. No sooner, however, did he find himself separated from me, than he vented strange cries, which I passed on without regarding. But, before I had advanced above a third of the way, the noise of a heavy flight made me turn my head, when I saw my Jacquot only four paces behind me. He followed me all the way, partly on foot, partly on wing, getting before me, and stopping at the cross-paths to mark the road I meant to take.—Our journey lasted from eight in the morning till ten at night; and my companion followed me through all the windings of the wood without seeming to be tired. After this adventure he attended me every where, and in fact began to grow troublesome; for I was not able to go to any place without his tracing my steps, so that one day he even entered the church, and found me. Another time, as he was passing by the rector's window, he heard me talking in the room, and as the door happened to be open, he

THE DUCK.

THERE are no fewer than ten varieties of the tame duck, and about double that number of the wild, between which the most obvious distinction is, that the tame ducks have yellow feet, and the wild black.

The common species of tame ducks derive their origin from the mallard, and may be traced to that fowl by unerring characters, namely, by the four middle feathers of the tail, which are black, and strangely turned up. Amid all that variety with which nature sports, in the colours of tame fowls, the common drake still retains this mark, demonstrating his affinity to those ancestors from which he originally sprung.

Tame ducks are reared with more facility than most other domestic animals. The very instinct of the young direct them to their favourite element; and though they are frequently hatched and conducted by hens, they contemn the admonitions of their step-dames; thus evincing, that all birds receive their manners rather from nature than education.

The hen, indeed, is a better foster-mother than the duck, which often leaves her eggs till they become corrupted; and should she perform the duty of incubation properly, she is afterwards very negligent of her charge, and seems to think, that by leading them forth to the water, she has made sufficient provision for them. On the contrary, the hen is an indefatigable nurse, even

walked up-stairs without ceremony, and marching in, gave a sudden and loud scream, to the no small affright of the family.

“Sorry I am, in relating such interesting traits of my good and faithful friend Jacquot, to be obliged to confess that it was myself who dissolved this singular connection. The fact is, a separation became necessary. Jacquot fancied himself as free in the best apartments, as in his own; and after several unpleasant circumstances of this nature, I ordered him to be shut up, and saw him no more. He lived about a year in this state of seclusion and inquietude, and at last died of chagrin. I was told that he became at last as dry as a bit of wood, for I did not venture to visit him; and his death was concealed from me for more than two months. Were I to recount all the instances of attachment displayed by this poor bird, it would occupy too much of my time, and tire your patience. He died in the third year of our friendship, and in the eighth year of his age.”

when rearing a spurious brood, and generally produces a duckling from every egg with which she is entrusted, while she attends to the young with the most painful solicitude; and when the young ducks, following instinct, take to the water, she uses every effort to recal them, and to preserve them from what she considers as destruction.

Tame ducks are extremely beneficial to mankind, and not expensive, in proportion to the quantity of food they yield when killed. They subsist on scattered corn, worms, snails, and other insects; and annually lay a great number of eggs, which are scarcely inferior to those of the hen.*

Wild ducks, from which our domestic breed is unquestionably derived, frequent the marshy grounds in many parts of this island, where they breed; but are no where so plenty as in Lincolnshire, where prodigious numbers are annually taken in the decoys, and sent to the London market. In ten decoys only, in the vicinity of Wainfleet, upwards of thirty thousand have been caught in a season. Their flesh is highly flavoured, and always fetches a good price among the epicures of the metropolis and other parts of the kingdom.

The usual season for catching wild ducks is from the

* This fowl is furnished with a peculiar structure of vessels about the heart, which enables it to live a considerable time under water, and is necessary for it in diving. This made Mr. Boyle think it a more suitable subject for experiments with the air-pump, than any other bird. A full grown duck being put into the receiver of an air-pump, of which she filled one-third part, on the air being exhausted, the creature seemed to bear it better for the first moments than a hen or other such fowl; but, after about a minute, she showed great signs of uneasiness, and in less than two minutes her head fell down; and she appeared dying, till revived by the letting in of the air. Thus, whatever facility of diving this and other water-fowl may have, it does not appear that they can subsist, without air for respiration, any longer than other animals. A young callow duck was afterwards tried in the same manner, and with the same success, being reduced very near death in less than two minutes. But both birds swelled on pumping out the air, so that they appeared much larger to the spectators, especially about the crop. It not being intended that any water-fowl should live in an exceedingly rarefied air, but only be able to continue occasionally some time under water.—Nature, though she has provided them with the means of this, has done nothing for them in regard to the other.

latter end of October to February. There is a parliamentary prohibition against pursuing this profitable pastime, between the first of June and the first of October.

Wild ducks are extremely artful birds. They frequently build their nests some distance from the water; and the female will carry the young in her beak, or between her legs, to their native element. Sometimes they have been known to lay their eggs in a lofty tree, in a nest deserted by a magpie or a crow; and a duck's nest was once found at Etchingham, in Sussex, formed of small twigs laid across between the branches of an oak, at the height of twenty-five feet from the ground.

We are told, that at Bold Hall, in Lancashire, during the summer season, a great number of wild ducks frequented the ponds and moat near the hall, and that they were regularly fed by a man, who assembled them together, by beating with a stone on a hollow wooden bowl. They flocked round him with all the familiarity of tame ducks; and, as soon as they had finished their repasts, they withdrew to their respective haunts.

The strongest instance of these creatures being calculated to live almost in any situation, we have in the accounts of the blind ducks in the Zirchnitzer lake in Carniola. It is supposed that this lake communicates with another lake under-ground in the mountain Savornic, and fills or empties itself according to the fulness or emptiness of that lake; the water of the upper lake running off, and that in vast quantities, by holes in the bottom. The ducks, which are here always in great numbers, are often carried down along with the water, and forced into the subterraneous lake to which it retires. In this unnatural habitation, many of these creatures undoubtedly perish, but some remain alive. These become blind, and lose all their feathers; and in the next filling of the lake, both they and vast numbers of fish are thrown up with the water. At this time they are fat, but make a strange appearance in their naked state, and are easily caught, by reason of their want of sight. In about a fortnight they recover their sight and feathers; and are then the size of a common wild duck, but of a black colour, with a white spot on their forehead. When opened, on being

taken at their first coming up in their blind state, their stomachs are found full of small fish, and somewhat resembling weeds. From this it seems that they cannot be absolutely blind; but that the degree of light to which they have been accustomed in their subterraneous habitation, was sufficient to enable them to procure food for themselves; and their blindness, on coming again into open day-light, is no other than that of a man who has been long in the dark, on having in an instant a large blaze of candles set before his eyes.

The widgeon and the teal belong to this family, and the flesh of both is highly esteemed. The ancient Romans used to rear considerable quantities of teal in a domestic state, and it can scarcely be doubted that the practice would succeed with us, if due attention were paid to it.

The eider duck deserves to be incidentally named, on account of its down, which, from its superior warmth, lightness, and elasticity, is preferred to every other kind of plumage for beds and coverlets. This bird frequents the western isles of Scotland, but it is much more numerous in countries that lie still farther north.

THE CORMORANT.

To those who are only approaching the temple of nature, marine birds are seldom very interesting. Their filthy habits, discordant notes, general inaptitude for human subsistence when dead, and the little service they render mankind when alive, all conspire to render them of comparatively inferior importance among the feathered race, and to diminish our attachment to them. We therefore shall just hasten to draw a general idea of sea-fowl, in the history of the cormorant and the gannet.—The other kinds are noticed in vol. II.

The *cormorant* is nearly as large as a goose, though its body is more slender. The base of the lower mandible is covered with a naked yellow skin, extending under the chin, and forming a sort of pouch. The male is distinguished by a loose pendant crest on the head, a white spot under the chin, and a tuft of the same colour outside each thigh. The plumage of the whole body is black, varying in certain aspects with glosses of green and blue. It has been found by navi-

gators in most parts of the world; and its flesh, though extremely rancid, sometimes affords a desirable repast to the famished sailor. The most frequent residence of this bird, when on shore; is the high cliffs which in many places impend our coasts, particularly among the precipices of St. Kilda. There, to the spectator, at the height of three-quarters of a mile above the surface of the sea, the vast waves that roll between the old and the new world, appear like the curl raised in a lake by a gentle breeze. On these tremendous elevations, the roaring of the Atlantic is softened down to the gentle murmurs of a brook; and the cormorants, with myriads of other water-fowl that skim below, seem scarcely so large as swallows.

These birds are likewise common round the high rocks of the Isle of Wight, where the sailors give them the ludicrous name of "Isle of Wight parsons."—Wherever they frequent, they build their nests on the highest part of the cliffs that hang over the sea, and lay three or four pale green eggs, about the size of those of a goose. During winter, they disperse along the shores, and visiting the fresh waters, commit astonishing depredations among the scaly tribes. In fact, the cormorant is perhaps the most voracious of all birds, owing to the vast number of worms that fill its intestines, and accelerate the progress of digestion. Spurred on by an insatiable appetite, it dives into the sea like an arrow, and with such well-directed aim, that its prey seldom escapes. It will sometimes remain under the water for a considerable time, but seldom appears above its surface without a fish crossways in its bill, which it tosses up into the air, and with remarkable agility seizes it by the head, before it can reach the water. In that position, by dilating its throat, it will swallow a fish apparently thicker than its neck.*

* In England, this bird was formerly domesticated, and trained to fish for the service of its owner. When thus employed, a ring was fastened round its neck, to prevent it from swallowing its prey; and as often as it caught a fish, it was instructed to carry it to its master. Even so late as the reign of Charles I. it appears that there was an officer of the royal household, entitled Master of the Cormorants. In China, the inhabitants still avail themselves of the skill of the cormorant in fishing; and one person can

THE GANNET,

OR Soland goose, is almost peculiar to the British isles, and therefore deserves to be selected for description, from the numbers of sea-fowl that line our coasts. It is somewhat more than three feet in length, and six in breadth, and weighs about seven pounds. The whole plumage is of a dirty white, inclining to grey; the eyes are of a pale yellow, and full of vivacity, and surrounded with a naked skin of a fine blue. The bill is six inches long, and furnished with a pouch sufficiently large to contain half a dozen of herrings, its principal food, during the season of incubation. Gannets are migratory, though the place of their retreat is not precisely known. They first arrive in Britain in March, and their departure is in August or September, according as they have been more or less disturbed in the business of nidification, those whose nests have not been plundered being always the first to migrate. Indeed, as they subsist almost entirely on herrings, probably their arrival and departure are influenced by the motions of those fishes, which they constantly attend during their circuit of the British isles. Hence, the gannet is extremely useful to fishermen, by indicating the tracks of the shoals of herrings. Following its prey, it is sometimes seen on the Cornish coast, and as far south as the mouth of the Tagus. It is excessively voracious; and allowing a single gannet to consume only five herrings a-day, it has been computed that one hundred millions are destroyed annually by the birds of this species, inhabiting St. Kilda alone.

In the breeding season, gannets retire to the highest and steepest rocks that line the northern coasts. They are found in vast numbers in the isle of Alisa, in the

manage a great number of them, which he carries out hooded upon the prow of his boat into a lake. On a signal given, they disperse over the expanse of the water; and each, according to his success, returns loaded to his master, who receives the booty, and again dispatches him to his employment. When a sufficient quantity has been caught, the bird has its neck untied, and is either rewarded with a portion of the spoil, or sent out to fish on its own account. Indeed, it is only hunger that gives activity to the cormorant; when glutted with food, it will remain for some hours without motion, in a state of listless apathy.

Frith of Clyde, on the rocks of St. Kilda, on the bass in the Frith of Forth, and on the Skelig isles, off the coast of Ireland. During the months of May and June, the surface of those dreary precipices is almost entirely covered with nests, eggs, and young birds; they darken the very sky, and their screams stun the auditory nerves.

Gannets form their nests of grass, sea-plants, or any other substance that floats on the water. They lay only one egg in the year: but if that is removed they will produce a second, or even a third, rather than desist from their duty. During the first year, the young are of a much darker hue than the parent birds, and become very fat before they leave their nests. At that period, their flesh is held in considerable estimation, particularly by the natives of St. Kilda, who undergo the greatest dangers for its acquisition. Indeed, the eggs and the flesh of the gannet constitute a principal support of the miserable natives of that sequestered spot throughout the year, and they preserve them in small-pyramidal stone buildings, covered with ashes, to defend them from moisture. To obtain their prey, the inhabitants climb the rocks frequented by the gannets, when this is practicable, passing along such narrow and precipitous paths as appal an ordinary beholder to contemplate. But when no dexterity can accomplish this, the fowler is lowered by a rope from the top of the cliff; and, to take the young, often stations himself on the most dangerous ledges, ransacking all the nests within his reach; and then, by means of a pole and his rope, moving to other places to do the same, till at last he is drawn up with the spoil he has collected; and, after a little respite, sets out on a second expedition of equal peril. The very reflection chills us with horror, yet habit reconciles the natives to this adventurous task, and renders them insensible to the dangers that surround them. They will hang suspended in the air by a rope, sometimes two hundred fathoms from the ground, regardless of their situation, or of the raging sea below; and it may be truly said, that in their eager pursuit, to obtain the means of living, they despise the fear of death.

A more easy and safe mode of catching the gannet, is by tying a herring to a board, and setting it afloat,

when the bird darts so furiously upon it, that it breaks its bill in the wood, or breaks its neck. A gannet was killed at Chandour, near Mountsbay, Sept. 30, 1762, after a long struggle with a water-spaniel, assisted by the boatmen; for it was strong and pugnacious. The person who took it observed that it had a transparent membrane under the eye-lid, with which it covered at pleasure the whole eye, without obscuring the sight, or shutting the eye-lid; a gracious provision for the security of the eyes of so weighty a creature, whose method of taking its prey is by darting headlong on it from a height of 150 feet or more into the water. A few years ago, one of these birds flying over Penzance, (a thing that rarely happens,) and seeing some pilchards lie on a fir plank, in a cellar used for curing fish, darted itself down with such violence, that it struck its bill quite through the board, (about an inch and a quarter thick,) and broke its neck.

It may have been noticed in passing along, how each animal has its peculiarities, and in some how exquisite the degree of sensation. Yet the degree of excellence, in these respects, have a different order in all other animals to that which they have in man. The sense most analogous to thinking is that of touch; which is less perfect in all than in man. The sense of smelling, that peculiar organ, which perceives objects not only where they are, but where they have been, is most analogous to instinct and appetite; and they have it in a superior degree; hence they excel in appetite; and we here observe their invincible aversion to certain aliments, and their natural appetite for such as correspond to their constitutions.

Again, they speak and understand each other; and their dialect has a simplicity unknown to that of man. Each species has a uniform idiom, always the same, in all ages, and in all countries of the world. Nightingales and canary-birds speak in precisely the same terms their ancestors employed before the deluge. Observe the dove, with his companion; what a language of love, tenderness, and expression! See the sparrow, how he scolds his mate when she plays the coquet! Look at

the morning herald, the cock, how he struts before his seraglio, and loudly bids defiance to his rivals who are abroad. Notice the little wren, how he knows his wife's voice, when she calls for him; how he ransacks the country for her at her desire, while she attends to her parental duties and watches her nest; how he, in all the endearments of domestic familiarity, converses with her from a neighbouring bough, while she fulfils her first maternal duty of incubating her eggs. And what care has this active, wandering, restless little creature to her eggs! And, though the little chatterers cannot abundantly vary their notes, yet they can ever speak to the purpose, and constantly with a knowledge of their subject; they cannot, certainly, branch it out; they must always speak the truth, and, even in love, be honest.

How wonderful is the maternal instinct of this class of animals! how completely does it direct the daily labour till the nest is completed! The female knows (but who shall tell how she has been taught) that she was to lay eggs, that a nest was absolutely requisite to preserve them from being fractured, and to bring them to perfection by a genial heat! which would not concentrate, was the nest too extensive; nor allow house-room for her brood, was it more narrow and contracted.

How contracted are the limits of human comprehension! While statesmen are offering rewards for the discovery of the longitude, the migratory birds traverse the trackless ocean, certain of their route, and of their latitude and longitude. Some bird assumes the charge of assembling the grand council, and of fixing the day of their departure. And they proceed unwearied to the place of their destination, without having their measures disconcerted by accidental rains, adverse winds, or long, dark, and dismal nights.

Let us then feel humbled by our consciousness of limited ability; and, while we determinately pursue to their utmost bounds the peculiarities of those objects presented for our observations, let us not be dissatisfied with ourselves, or them, because we cannot, in every instance, unravel every intricacy in their habits, customs, and modes of existence.

ZOOPHYTES.

LECTURE LXIX.

CORAL.—The *Millepora Alga* consists of a hydra in a habitation of thin semi-circular plates, disposed horizontally, and inhabits the Cornish coast, adhering to, and covering the *polymorpha*; and is red, purple, or white, extremely thin and brittle, with semicircular plates of various sizes constantly growing horizontally, with their margins bending over, making them convex on the upper side and concave beneath.

The *Millepora Polymorpha* is the common coral of the shops. It is crustaceous, solid, irregularly shaped, but generally branched, and tuberculate, and without visible pores. It inhabits most European seas; and in many places grows so very abundantly as to be burnt for manure; its colour is either red, yellowish, or greenish cinereous, and seldom white. Sometimes it is shaped like the kernel of a walnut; often in large compressed masses; sometimes like a small bunch of grapes; but most frequently in short irregular ramifications, of a chalky tuberculate appearance, and of a stony substance.

The *Warty Coral* is found adhering to rocks and stones; it is bifarious, the bone of a substance between wood and horn, with round flexuous branches, often above three feet high, of a fan-shaped form, with orange or yellow calcareous bark, covered with white prominent florets, the mouths whereby the animal feeds. It is of a dirty white colour when dry. For *Venus' Fan*, see vol. II.

SPONGE.

I. BRANCHED SPONGE, (*oculata*,) is delicately soft and very much branched; the branches are a little compressed, grow erect, and often united; with rows of projecting cells on each margin. It is of a pale yellow

colour, from five to ten inches high. The fibres are reticulated, and the fleshy or gelatinous part is so tender, that when it is taken out of the water it soon dries away. It is very common round the coasts of Britain and Ireland.

2. COCK'S-COMB SPONGE, (*christata*,) is flat, erect, and soft, growing in the shape of the article whence its name, with rows of little holes along the tops, which project a little. It abounds and may be seen at low-water on the rocks east of Hastings, in Sussex. It is commonly about three inches long, two inches high, and of a pale yellowish colour. When put into a glass vessel of sea-water, it has been observed to suck in and squirt out the water, through little mouths along the tops, giving evident signs of animation.

3. TOW-SPONGE, (*stuposa*,) or downy branched sponge, is soft like tow, with round branches, and covered with fine pointed hairs. It is of a pale yellow colour, and about three inches high. It is frequently thrown ashore at Hastings. It is so closely covered with a fine down, that the numerous small holes in its surface are not easily discernible.

4. DICHOTOMOUS, or forked sponge, (*dichotoma*,) is stiff, branched, with round, upright, elastic branches, covered with minute hairs. It is found on the Cornish and Yorkshire coasts, and also on the coast of Norway. It is of a pale yellow colour, and full of very minute pores, guarded by minute spines.

5. STINGING SPONGE, or crumb of bread sponge, (*urens* or *tomentosa*) is of many forms, full of pores, very brittle and soft, and interwoven with very minute spines. It is full of small protuberances, with a hole in each, by which it sucks in and throws out the water.— It is very common on the British coast, and is frequently seen surrounding fucuses. It is found also on the shores of North America, Africa, and the East Indies. When newly taken out of the sea, it is of a bright orange colour, and full of gelatinous flesh; but when dry it becomes whitish, and when broken, has the appearance of a crumb of bread. If rubbed on the hand it will raise blisters; and, if dried in an oven, its power of stinging is much increased, especially that variety found on the coast of North America.

6. PALMATED SPONGE, (*palmata*,) is like a hand with fingers a little divided at the top. The mouths are a little prominent, and irregularly disposed on the surface. It is found on the beach, at Brighthelmstone. It is of a reddish colour, inclining to yellow, and of the same soft woolly texture as the *oculata*.

7. CORONET SPONGE, (*coronata*,) is very small; consisting of a single tube, open at the top; surrounded at top by a crown of little spines, whose rays are of a bright shining pearl colour; the body is of a pale yellow. It has been found in the harbour of Emsworth, between Sussex and Hampshire.

8. GRAPE SPONGE, (*botryoides*,) is very tender and branched, as if in bunches; each is open at the top; the bunches are hollow, and consist of oblong oval figures, having the appearance of grapes: this species is of a bright shining colour. The openings at the top are the mouths by which the animal imbibes and discharges moisture. When the surface is very much magnified, it appears covered with little masses of triple, equidistant, shining spines.

9. CREEPING SPONGE, (*lacustris*,) has erect, cylindrical, and obtuse branches. It is found in lakes in England and Sweden.

10. RIVER SPONGE, (*fluvialis*,) is green, erect, brittle, and irregularly disposed in numerous branches. It abounds in many parts of Europe, in the fresh rivers of Russia and England, but particularly in the river Thames. It scarcely exhibits any symptoms of vitality, is of a fishy smell; and its pores, or mouths, are sometimes filled with green gelatinous globules. It differs very little from the *lacustris*.

KERATOPHYTUM,

A SPECIES of gorgonia. The keratophyta are the *frutices coralloides*, or sea shrubs; and generally known by the appellations of *litophyta*, *lithoxyla*, and *keratophyta*; as their composition, at first view, seems to consist partly of a woody, horny, or calcareous substance, variously disposed. Their general form approaches to that of shrubs, having a root-like base, by which they adhere to some solid support in the ocean; and a stem or trunk, and branches differently disposed,

some rising up in one or more different twigs, subdivided into smaller and separate ramifications; while others have their smaller branches so connected, as to form a curious net-like structure; from this diversity of figure they borrow the names of sea-fans, sea-feathers, &c.—The seeming fibres of the base are, in reality, small tubes, of which the whole shrub consists; these tubes run up longitudinally into the trunk, and are also circularly disposed about its centre; the woody part, thus formed, affords, when burnt, a strong smell like burning horn; whence some call it the horny part. Upon this part is superinduced a kind of stony or calcareous coat, (which covers both trunk and branches to their extremities,) in which may be discovered regular pores of cells; and, viewed by the microscope, it appears to be an organical body consisting of a regular congeries, like the cells in which animals have been formed or existed. Some of this kind of bodies have lost their calcareous covering by the violence of the waves and other accidents. In some specimens of an advanced growth, the calcareous tubes just mentioned send out little cells of animals of the polype kind, with proper openings to them all; these cells are diffused along the branches in some regular order, much in the same manner as in corallines. From the cells the animals have been discovered extending themselves, as well to procure food as materials for the increase of this surprising structure; and, therefore, there is no doubt that they are animal productions.

NEREIS,

THE body is oblong, linear, and fitted for creeping; it is furnished with lateral pencilled tentacula. The species most remarkable are, the *noctiluca*, or noctilucous nereis, which inhabits most seas, and is one cause of the luminousness of the water. These creatures shine like glow-worms, but with a brighter splendour, so as at night to make the element appear as if on fire all around. Their bodies are extremely minute, and elude examination by the naked eye.

The *nereis phosphorans* has the head roundish and flat, and the mouth acuminate. The two tentacula short and subulated. The eyes prominent on each side

the head. The body composed of about twenty-three segments or joints, diminishing near the tail, and on both sides the animal, they end in a short conical apex, out of which proceed some hairs; from under these the feet grow, as small flexile subulated figments, destitute of claws. They are scarcely two lines long, quite pellucid, and its colour water-green; found upon all kinds of marine plants; though they often leave them, and are found upon the surface of the water: they are frequent at all seasons, but in summer especially, before stormy weather, are more agitated and more luminous. Their numbers and wonderful agility, added to their pellucid and shining quality, contribute to illuminate the sea; for myriads of them may be contained in the portion of a small cup of sea-water. Innumerable quantities lodge in the cavities of the scales of fishes, and to them probably do the fishes owe their noctilucous quality. Barbut observed, with great attention, a fish just caught out of the sea, whose body was almost covered with them, and examined them in the dark: they twist and curl with amazing agility, but soon retire out of our contracted sight; probably their glittering numbers dazzle the eye, and their extreme minuteness elude research. When the unctuous moisture which covers the scales of fishes is exhausted, these animals are not to be seen; nor are the fishes then noctilucous, that matter being perhaps their nourishment when living, as they themselves afford food to many marine animals. They do not shine in the day-time, because the solar rays are too powerful for their light, however aggregate or immense their number—Their appearance is particularly brilliant when the wind is east or south-east; and in winter-nights preceded by a warm day. If water containing them be kept warm, after they are dead, they retain their light two whole days, but in cold water lose it in eight hours; motion and warmth, which increase their vivacity and strength, increase their light also.

The BOG NEREIS (*nereis lacustris*.) The body the size of a hog's short bristle, transparent, articulated, and on either side at every articulation provided with a short setaceous foot; interiorly it seems to consist of oval-shaped articulations, and a back formed by two lines

bent backwards. It inhabits marshes abounding in clay, where it remains under ground, pushing out its other extremity by its continual motion, and when taken out it twists itself up.

The **WAVING NEREIS**, (*nereis cirrosa*,) has the body red, lumbriciform, with sixty-five notches, furnished on both sides with two rows of bristles. At each side of the head ten filaments, at the sides of the mouth many, twice as long as the former. It dwells in Norway, on rocks at the bottom of the sea. It vomits a red liquor, which tinges the water.

The **GIANT NEREIS**, (*nereis gigantæa*,) is a peculiar species of those large worms that make their way into decayed piles driven down into the sea, which they bore through and feed upon, whence they are called sea-worms, or nereis. From head to tail they are beset on either side with small tufts, terminating in three points; which are like the fine hair-pencils used by painters, and composed of shining bristles of various colours. The upper part of the body in this worm is all over covered with small hairs. The rings of which it is formed are closely pressed together, and yield to the touch. The three rows of small tufts serve instead of feet, which it uses to go forwards, as fishes do their fins.

THE LEECH, (*Hirudo*.)

THE body is oblong, flattened, and very contractile; anterior extremity very gradually attenuated; skin very tough. It moves either forward or backward. The several species are principally distinguished by their colour. —The most remarkable are, 1. **MEDICINAL LEECH**, (*medicinalis*,) which in length commonly grows to two or three inches. The body is of a blackish brown, on the back are six yellow spots, and each side edged with a yellow line; but the spots and lines almost disappear at some seasons. The head is smaller than the tail, which fixes itself very firmly to any thing the creature pleases. It is viviparous, and produces but one at a time, in July. It is an inhabitant of clear running waters, and is well known for its use in bleeding.

2. The **HORSE LEECH**, (*sanguisuga*;) is larger than the preceding. Its skin is smooth and glossy; the body depressed, the back dusky, and the belly of a yellowish

green, having a yellow lateral margin. It inhabits stagnant waters.

3. The GEOMETRICAL LEECH, (*geometra*,) grows to an inch and a half in length; and has a smooth and glossy dusky-brown skin; but in some seasons greenish, spotted with white. In motion, its back is elevated into a ridge; and it appears as if measuring the space it passed over, like a compass, whence its name. Its tail is broad, and holds as firmly as the head. It is common on stones, in shallow running waters, and is often found on trout and other fish after spawning.

4. The MURICATED LEECH, (*pontolidella*,) has a taper body, rounded at the greater extremity, slightly contractile, and furnished with two small tentacula, or horns, strongly annulated and rugged upon the rings, the tail dilated, and the skin subcoriaceous. It inhabits the Atlantic Ocean, and is by the fishermen called the sea-leech. It adheres to fish, and hence is called the skate-sucker; and generally leaves a black mark on the spot. When bruised it emits a dark liquor, which stains of a beautiful blue colour.

The organs of generation resemble those of snails. (See *Helix*.) The leech's head is armed with a sharp instrument, of three sharp tubercles, to make three wounds at once. They are strong enough to cut through the skin of a man, ox, or horse. The mouth is the body of the pump, and the tongue or fleshy nipple the sucker; by working this piece of mechanism, the blood is raised up to the animal's stomach, a membranaceous skin of twenty-four small cells. The blood sucked out is there preserved for several months, without coagulating, and proves a store of provision to the animal. The nutritious parts, pure and already digested by animals, have no call to be disengaged from heterogeneous substances; nor indeed is an anus discoverable in the leech; mere transpiration seems all that it performs, the matter fixing on the surface of its body, and afterwards coming off in small threads.*

* Of this an experiment may be tried by putting a leech into oil, where it keeps alive for several days; upon being taken out and put into water, there appears to loosen from its body a kind of slough, shaped like the creature's body.

The organ of respiration seems to be situated in the mouth; for did it, like an insect, draw its breath through vent holes, it would not subsist in oil, as they would be stopped.

Thus only the first species is used in medicine; being applied to the skin to draw off blood. They are employed to phlebotomize young children. If the leech does not fasten, a drop of sugared milk is put on the spot it is wished to fix on, or a little blood is drawn by a slight puncture, after which it immediately fixes.—The leech when fixed should be watched, lest when used for the hemorrhoids, it should find its way into the anus, or penetrate into the œsophagus if employed to draw the gums; otherwise it would make great havoc internally. In such a case the quickest remedy is to swallow salt, which makes it loose its hold sooner than was intended. Pepper and acids make it quit the part on which it was applied. Cows and horses have received them, in drinking, into the throat; the usual remedy is to force down some salt, which makes them fall off. When it is intended that the leech should draw a large quantity of blood, the end of its tail is cut off, and it then sucks continually to make up the loss. The discharge occasioned by the puncture of a leech is usually of more service than the process itself. When too abundant it is easily stopped with brandy, vinegar, or other styptics, or with a compress of dry linen-rag bound on the orifice.

At Ceylon, travellers who walk bare-legged are molested by numbers of leeches concealed under the grass. All leeches vary in their colours at some seasons, but they are generally of a dusky greenish brown or yellow, and often variegated. They are said to be very restless before a change of weather, if confined in glasses.

TESTACEOUS.

THE SLUG, (*Limax*.)

THIS is the most simple and humble of this class of worms; and, being well-known, affords a ready comprehension of the shiny retractile properties of the flesh of these animals, which can expand or contract at pleasure. The pulmonary orifice is near the posterior margin of the shield. It differs from the arion in the absence of the caudal mucouspore, the position of the pulmonary cavity, and the orifice of the sexual organs, under the superior right tentaculum. The calcareous matter of the shield is more solid, and appears as a shelly plate. The body is oblong, fitted for crawling, and the belly is plain. The mouth or aperture is on the right-side, within the

shield, and an eye is on the top of each of the large of four tentacula, or horns, situated above the mouth, extended or retracted at pleasure. This worm is always destitute of shell; but while its skin is more clammy, and of a greater consistency than that of the snail, the black naked slug has a furrowed cloak, almost as thick and as hard as leather, under which it draws its head, as within a shell. The head is distinguished from the breast by a black line. In its head and back is the snail-stone found—a small pearly and sandy stone, of the nature of lime-stones, which, according to a popular opinion, cures the tertian ague, when fastened to the patient's arm. These slugs move on slowly, leaving every where clammy and shining marks of their passage. Their coming together is towards the end of spring. The organs of generation are placed, as in the snail, on the right-side of the neck. The male organ unfolds with the same mechanism as the finger of a glove when turned inside out. They are sometimes met with hanging in the air, with their heads downwards, and their tails, united by a kind of viscous and thick tie, grappled to the branch of a tree. In this situation they remain for three hours, and that is the time of impregnation. They deposit their eggs in the earth. The species are distinguished entirely by their colour; as the black slug, the white slug, the reddish slug, the ash-coloured slug, &c. The black slug is hermaphrodite, both sexes being in each individual, and in coitu, both impregnate and are impregnated at the same time. A black slug powdered over with snuff, salt, or sugar, falls into convulsions, casts forth all its foam, and dies.

THE EDIBLE SNAIL, (*Pomatia*.)

(See SNAILS. Vol. II.)

THIS kind of snail has five spires, most remarkably ventricose, and fasciated with a lighter and deeper brown; it inhabits the woods in France, but has been naturalized in the woods of the southern counties in England. It was introduced by Sir Kenelm Digby; whether for medical purposes, or as food, is uncertain; tradition says, that to cure his beloved wife of a decay was the ob-

ject. They are quite confined to our southern counties. An attempt was made to bring them into Northamptonshire, but they would not live there. These are used for food in several parts of Europe during Lent; and are preserved in an escargatoire, or a large place boarded in, with a floor covered half-a-foot deep with herbs, in which the snails nestle and fatten.*

The GARDEN-SNAIL (*hortensis*) is in form like the last, but less, and not umbilicated and clouded, or mottled with browns. It abounds with a viscid slimy juice, readily given out by boiling in milk or water, so as to render them thick and glutinous. The decoctions in milk are very nutritious and demulcent, and have been recommended in a thin acrimonious state of the humours, in consumptive cases, and emaciations. The eyes of snails are lodged at the tip of the two longest tentacula of four, which they can retract at pleasure.†

Snails are hermaphrodites, or both sexes united in each individual. They lay their eggs with great care in

* They were a favourite dish with the Romans, who had their cochlearia, a nursery, similar to the above. Fulvius Hirpinus was the first inventor of this luxury, a little before the civil wars between Cæsar and Pompey. The snails were fed with bran and sodden wine. Could we credit Varro, they grew so large, that the shells of some would hold ten quarts! People need not admire the temperance of the supper of the younger Pliny, which consisted of only a lettuce a-piece, three snails, two eggs, a barley-cake, sweet wine and snow, in case his snails bore any proportion in size to those of Hirpinus. Its name is derived, not from any thing relating to an orchard, but from *περμα*, an operculum, it having a very strong one. This seems the species described by Pliny, (lib. viii. c. 39.) as scarce, that it covered itself with the opercle, and lodged under ground; and that they were at first found only about the maritime Alps, and more lately near Velitræ.

† The manner of examining these eyes, which are four in number, is this:—When the tentacula are out, cut off nimbly the extremity of one of the longest, and place it before the microscope, you may discover the black spot at the end to be really a semi-globular eye. The dissection of this animal is very curious; for thereby the microscope not only discovers the heart beating against the round hole near the neck, which seems the place of respiration, but also the liver, spleen, stomach, and intestines, with the veins, arteries, mouth, and teeth, are plainly discernable. The guts of this creature are green, from its eating herbs, and are branched all over with fine capillary white veins; the mouth is like a hare's or rabbit's, with four or six needle teeth, resembling those of leeches, and of a substance like horn.

the earth, and the young ones are hatched with shells completely formed. Cutting off a snail's head, a little stone appears, supposed to be a great diuretic, and good in all nephritic disorders. Immediately under this stone, the heart is seen beating; and the auricles, with the vessels which proceed from them, are distinguishable and are membranous, and of a white colour.

Snails discharge their excrements at a hole in their neck, by which they also breathe, and near it are their parts of generation situated. The penis is very long, and resembles the whale's in shape. In the process of generation, with the male and female part there issues at the aperture of the neck a kind of spear, with a lance-shaped head, terminating in a very acute point; and when the two snails turn their orifices towards each other, the spear issuing from one pricks the other, and then either drops to the ground, or is carried off by the snail it has pricked. The snail instantly withdraws, but soon rejoins the other, which in its turn it pricks, and after such mutual puncture the copulation is consummated. Snails couple thrice, at about fifteen days interval, nature producing a new spear for each time of copulation, which lasts ten or twelve hours. In about eighteen days they bring forth their eggs by the aperture of their neck.*

ASTERIAS, STAR-FISH, OR SEA-STAR.

It has a depressed body, covered with a coriaceous coat, is composed of five or more segments, running out from a central part, and furnished with numerous tentacula. The mouth is in the centre, armed with sharp teeth, which convey the food into the body; and from this

* So small an animal as the snail is not free from the plague of supporting other smaller animals on its body; and, as in other animals, we find these secondary ones either living only on their surface, as lice, &c. or only in the intestines as worms, it is very remarkable that this creature is infested in both ways. A part of the common garden-snail, and of others, is commonly called the collar; and surrounds the neck, is considerably thick, and the only part visible when the animal is retired quietly into its shell. In this state of the animal, the insects which infest it may be seen in considerable numbers, marching about nimbly on this part; besides, the snail, every time it has occasion to open the anus, gives them a place by which to enter its intestines, and they often seize the opportunity,

mouth goes a separate canal through many of the rays. The tentacula resemble the horns of snails, but serve the animal for progression. They are capable of contraction; and only on the creature's moving is their full length seen.

Most asterias are found in the British seas.

1. **THE GLACIALIS**, with five rays, depressed, broad at the base, yellow, and having a round striated operculum on the back, is the most common; it feeds on oysters, and is very destructive to the beds.

2. **THE CANCELLED SEA-STAR**, (*Clathrata*), with five short thick rays, hirsute beneath, cancellated above, is found with the former, but more rare.

3. **THE OCULATA**, with five smooth rays, dotted or punctured, is of a fine purple colour, found about Anglesea.

4. **THE HISPIDA**, with five rays, broad, angulated at top, and rough, with short bristles, is of a brown colour, also found about Anglesea.

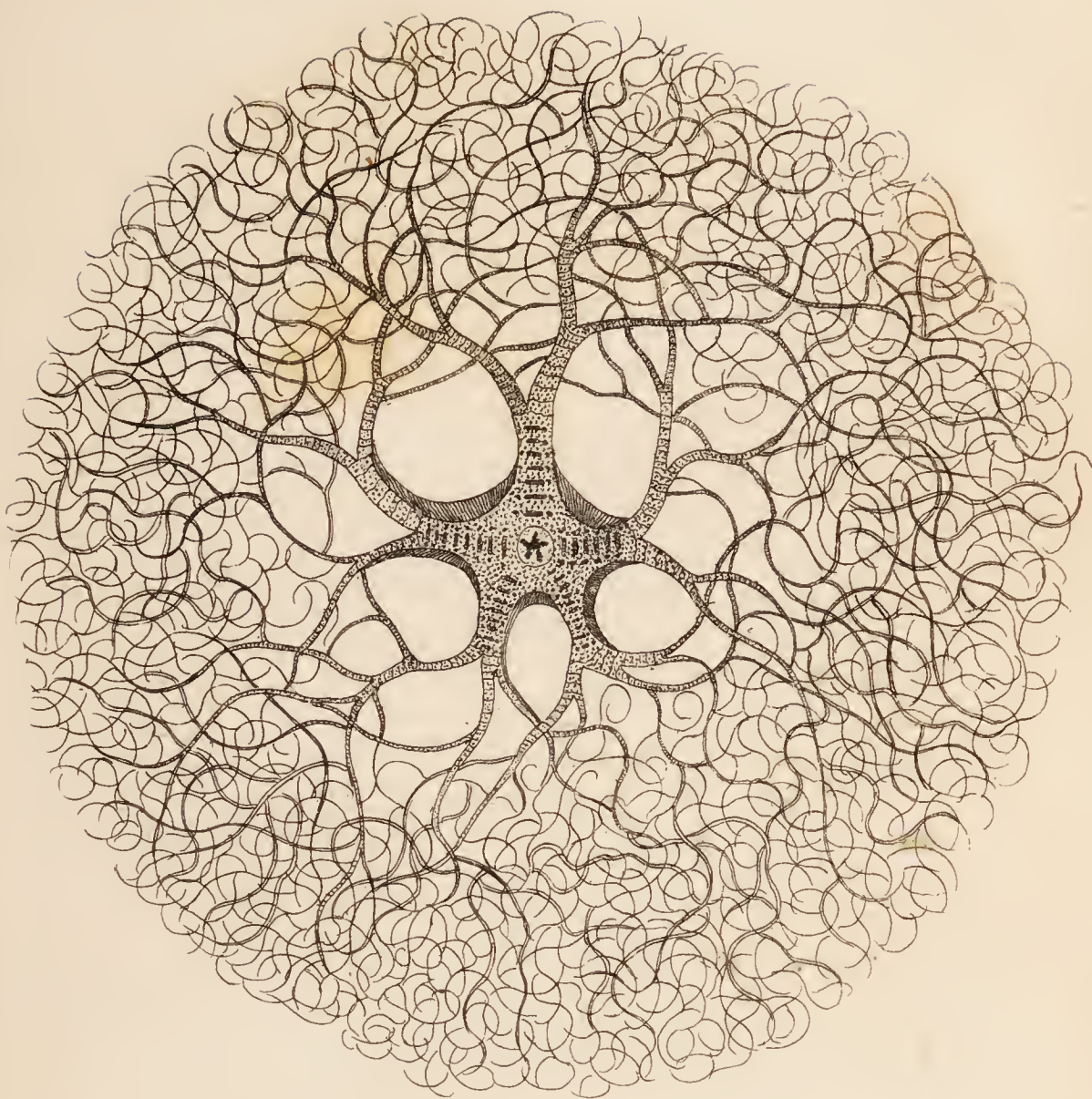
5. **THE PLACENTA**, with five very broad and membranaceous rays, extremely thin and flat, found about Weymouth.

6. **THE SPHERULATA**, with a pentagonal indented body, a small globular head between the base of each ray, the rays slender, jointed, taper, and hirsute on their sides, found off Anglesea.

7. **THE ARBORESCENT SEA-STAR**, (*caput medusæ*) with five rays issuing from an angular body; the rays dividing into innumerable branches, growing slender as they recede from the base. These the animal, in swimming, spreads like a net to their full length; and when he perceives any prey within them, draws them in again, thus catching it with all the dexterity of a fisherman. It is an inhabitant of every sea: and is called by some the Magellanic star-fish and basket-fish. When it extends its rays fully, it forms a circle of near three feet in diameter.

THE SEA-LEMON, (*Doris argo*.)

THIS animal belongs to the branchifera, (vol. ii. *Deris*.) The subject is found in the British seas; the body is smooth, oval, convex, marked with numerous punctures,



BRANCHED ASTERIAS
OR
MEDUSEAN STARFISH.

of different colours, from a bright to a dull yellow, and the vent is surrounded with elegant ramifications.

THE LIMPET, (*Patella*, Vol. II.)

THE animal is of the snail kind. The shells are *uni-valves*, without *contour*, in the form of little plates, or bluntly pointed cones, and always attached to some hard body. Their summit is acute, obtuse, flattened, turned back, or perforated. The rock or other hard body to which they always adhere, serves as a kind of second or under shell to preserve them from injury. Fabius Columna distinguishes four sorts of the *lepas* or limpets: *Lepas vulgaris*, a sort very common at Naples, of an oval figure and ash colour. *Lepas major exotica*, which comes from Spain; the shell is hard, thick, and ribbed in angles, and the rim is denticulated. The *lepas agrea*, or *sylvestris*, has a small shell, irregularly oval, of an ash-colour, marked with radii and zones crossing each other, and perforated at the top, which serves the fish for a vent. The *patella regalis*, is of a mother-of-pearl colour within, ribbed and perforated in many places, sometimes found on the back of the sea-tortoise, or turtle, and on a large pinna marina. The distinguishing mark or characteristic of the *lepas* is to have but one convex shell, which adheres by its rim to a rock, or some other hard substance. The chambered limpets have a peculiar projection or lip within; most have the margin entire, but some have a fissure in it, and others are spiral or wreathed.

THE OYSTER, (*Ostrea*.)

THE shell has two unequal valves; the *cardo* has no teeth, but a small hollowed one with transverse lateral streaks. The common oyster is reckoned an excellent food; and is eaten both raw and variously prepared. Barbut says, the animal is a *tethys*, the shell cemented with a hinge resembling a pair of ears; the hinge void of teeth, with a deep oval hole, and transverse streaks on the sides;—body destitute of a foot;—there is no womb nor anus. The genus is divided into four families, of which *ostrea* is the last. The same author gives us the following enlarged account of the oyster.

This sea-fish occupies, in the scale of nature, one of the degrees most remote from perfection; destitute of defensive weapons and progressive motion, without art or industry, it is reduced to mere existence, in perpetual imprisonment, though it every day opens regularly to enjoy the element necessary for its preservation. The animal figure, and the springs of its organization, are scarce discernible through the coarse and shapeless mass; a ligament placed at the summit of the shell serves as an arm to its operations. Oysters are reputed to be hermaphrodites, their spawn cast in May, adheres to the rocks and other matters in the sea: and in twenty-four hours is provided with shells, which contain other oysters, that never leave the spot on which they were fixed, till the greedy fisherman tears them away.

The green oysters eaten at Paris are commonly brought from Dieppe, their delicacy and colour are owing to the care taken to bed them in creeks, encompassed with verdure. Common oysters should be fresh, tender, and moist. The most esteemed are caught at the mouth of rivers, and in clear water. Great account is made of oysters from Brittany, but still greater of those from Marennes in Saintonge. Those are preferred edged with a small brown fringe, or beard, which epicures call fecundated oysters; but those are not females. The want of fresh water renders oysters hard, bitter, and unpalatable. Mud and sea-weeds destroy them, and galangal root, mussels, scollops, sea-stars, and crabs, are their formidable enemies. In Spain are found red and russet oysters; in Illyria, brown, with the flesh black; and in the Red Sea, of the colour of the Iris. Oysters of the mangle-tree are of two sorts; those of St. Domingo are delicate, adhering to the stumps of the trees that dip in the water. The negro divers cut them off, and they are served at table with the roots.

Britain has been noted for oysters from the time of Juvenal, who, satyrizing Montanus, an epicure, says—

Circaeis nata forent, an
Lucrinum ad saxum, Rutupinove edita fundo,
Ostrea, callebat primo deprendere morsu,

He, whether Circe's rock his oysters bore,
Or Lucrine lake, or distant Richborough's shore,
Knew at first taste.

According to Pennant, the luxurious Romans were very fond of this fish, and had, like ourselves, layers or stews for oysters. Sergius Orata first invented the stews, at the time of L. Crassus the orator, not for the sake of indulging his appetite, but through avarice, and made great profits from them. Orata got great credit for his Lucrine oysters; for, says Pliny, the British were not then known. The ancients eat them raw, having them carried up unopened, and generally eating them at the beginning of the entertainment, but sometimes roasted. They had also a custom of stewing them with mallows and ducks, or with fish, and esteemed them very nourishing.

Britain still keeps its superiority in oysters over other countries. Most of our coasts produce them naturally, and in such places they are taken by dredging, and are become an article of commerce, both raw and pickled. The shells, calcined, are useful as an absorbent. In common with other shells, they form an excellent manure.

Stews or layers of oysters are formed in places which nature never allotted as habitations for them. Those near Colchester have been long famous; but, at present, others near the mouth of the Thames rival them. The oysters, or their spawns, are brought to convenient places, where they improve in taste and size. The supposition that the fine green in oysters, from artificial beds, is owing to copperas is erroneous, it being notorious how destructive that substance is to all fish.

We cannot give a better account of the whole treatment of oysters, than that preserved in Sprat's History of the Royal Society:—

In May, oysters cast their spawn, by the dredgers called spat; like a drop of candle, and about the bigness of a halfpenny. The spat cleaves to stones, old oyster-shells, pieces of wood, and such-like things, called clutch, at the bottom of the sea. It is conjectured, that the spat in twenty-four hours begins to have a shell. In May, the dredgers (by the law of the admiralty-court,) have liberty to catch all manner of oysters, of what size soever. When they have taken them, with a knife they gently raise the small brood from the clutch, and then they throw the clutch in again, to preserve the ground for the future, unless they be so newly spat, that they cannot be safely severed, in that case they are permitted to take the stone, or shell, &c. that the spat is upon, one shell having at times twenty spats. After May, it is felony to carry away the clutch, and punishable to take any other oysters

but those of the bigness of an half-crown piece, or when, the two shells being shut, a fair shilling will rattle between them.

The chief places where these oysters are catched, are called the Pent, Burnham, Malden, and Colne waters; the latter named from the river of Colne, which passeth by Colchester, gives name to that town, and in the suburbs runs into a creek of the sea, at the Hythe. This brood and other oysters, carried to the creeks of the sea, at Brickelsea, Melsy, Langno, Fingrego, Wivenho, Tolesbury, and Saltease, are there thrown into the channel, into what are called beds, or layers, where they grow and fatten; and in two or three years the smallest brood become oysters of the size aforesaid. Those oysters they would have green, are put into pits, about three feet deep, in the salt marshes, overflowed only at spring-tides, to which are sluices, to let out the salt-water until it is about eighteen inches deep. These pits, from some quality in the soil co-operating with the solar heat, become green, and, in four or five days, communicate their colour to the oysters put in, though they commonly continue six weeks or two months, and become a dark green. To prove that the sun operates in the greening, Tolesbury pits will green only in summer; but, that the earth hath the greater power, Brickelsea pits green both winter and summer, and for a further proof, a pit within a foot of a greening-pit will not green; and those that did green very well, in time lose their quality. The oysters, when the tide comes in, lie with their hollow shell downwards; and when it goes out, they turn on the other side; they remove not from their place, unless in cold weather, to cover themselves in the ouse.

Great penalties are by the admiralty-court laid upon those that fish out of those grounds which the court appoints, or that destroy the clutch, or that take any oysters not of size, or that do not tread under their feet, or throw upon the shore, a fish which they call a five finger, resembling a sparrow, because that fish gets into the oysters when they gape, and sucks them out. The reason of such a penalty, upon any that shall destroy the clutch, is because if that be taken away, the ouse will increase, and the mussels and cockles will breed there, and destroy the oysters, which have not wherewith to stick their spat.

The oysters are sick after they have spat, but in June and July begin to mend, and in August are perfectly well: the male oyster is black sick, having a black substance in the fin; the female white sick (as they term it), having a milky substance in the fin. They are salt in the pits, salter in the layers, but saltiest at sea.

The oyster has been supposed one of the most sluggish animals in nature, and totally incapable of voluntary motion, but this opinion seems erroneous; like many other bivalved shell-fish, this has a power of squirting water out from its body, which property may easily be observed, by putting some of them on a plate, and covering them with sea-water. The water is ejected so forcibly, as not only to repel the approach of ora-

dinary enemies, but to move the whole animal in a contrary direction. It has been also supposed, that oysters are destitute of sensation ; but they do not only possess sensation, but are capable of deriving knowledge from experience. When removed from places entirely covered with the sea, when destitute of experience, they open their shells and die in a few days ; but if they happen to escape this danger, and the water covers them again, they will not open their shells again, but keep them shut as if warned by experience to avoid a danger similar to what they formerly underwent.

The oyster affords curious microscopic observations, a very pleasing entertainment. In the clear liquor many little round living animalcules have been found, whose bodies being conjoined, form spherical figures, with tails, not changing their place otherwise than by sinking to the bottom, as being heavier than the fluid ; these have often been seen separating and then coming together again. In other oysters, animalcules of the same kind were found, not conjoined, but swimming by each other, whence they seemed in a more perfect state ; and Leeuwenhoek supposed they were animalcules in the roc or semen of the oyster. A female oyster being opened, incredible multitudes of small embryo oysters were seen, covered with little shells, perfectly transparent, and swimming along slowly in the liquor, and in another female, the young ones were found of a browner colour, but without any appearance of life or motion. Joblot kept the water running from oysters three days, and it appeared full of young oysters swimming about nimbly in it ; these increased in size daily ; but a mixture of wine, or the vapour of vinegar, killed them.

In August oysters are supposed to breed, young ones being then found in them. Leeuwenhoek, on the 4th of August, opened an oyster, and took out a prodigious number of minute oysters, alive, and swimming nimbly about, by certain exceeding small organs, which he calls their beards, extending a little way beyond their shells. In these little oysters, he discovered the joinings of the shells ; and perceived some dead ones, with their shells gaping. These, though so extremely minute, are as like the large oysters in form as one egg is to another. As to their size, he computes that 120 in a row would

extend an inch ; and, consequently, that a globular body, whose diameter is an inch, would, were they also round, be equal to 1,728,000 of them. He reckons three or four thousand are in one oyster, and found many of the embryo oysters among the beards ; some fastened by slender filaments, and others lying loose ; he likewise found animalcules in the liquor five hundred times less than the embryo oysters.

Often on oyster-shells is seen, when in a dark place, a shining matter, or blueish light, like a flame of brimstone, which sticks to the fingers when touched, and continues shining and giving light a considerable time, though without any sensible heat. This shining matter, examined with a microscope, consists of three sorts of animalcules ; the first whitish, with twenty-four or twenty-five legs on a-side, forked, a black speck on the head, the back like an eel with the skin stripped off. The second sort red, resembling the common glow-worm, with folds on its back, but legs like the former, a nose like a dog's, and one eye in the head. The third sort speckled, head like a sole, with many tufts of whitish hairs on its sides. Some much larger and greyish might be seen, having great heads, two horns like a snail's, and six or eight whitish feet ; but these did not seem to shine.

THE MUSSEL. (*Mytillus*, Vol. II.)

THE edible mussel, (*edulis*,) has a strong shell, slightly incurvated on one side, and angulated on the other. The end near the hinge is pointed, the other rounded, of a deep blue colour, when the epidermis is taken off. It is found in immense beds, both in deep water and above low-water mark. The finest mussels in Britain are those called Hambleton hookers. They are taken out of the sea, and placed in the river Wier, within reach of the tide, where they grow very fat and delicious. This species inhabits the European and Indian seas. Between the tropics it is largest, and smallest within the polar circle. It is hurtful if too often eat, or in too great quantities ; and even sometimes poisonous.

If they lie in shallow places, a small circular motion is seen above the heel of the shell ; and a few moments after, by one single stroke, they cast out the water at

the other end of the shell. The mouth is situated near the sharp angle of the animal, and is furnished with four floating fringes, like mustachios, which probably answer the purpose of lips. The barbs, round the edge of near half the mussel, are a wonderful web of hollow fibres, which serve as fins or organs of respiration, at the vessels for the circulation of the fluids, and probably as wedges for opening their shells: for we observe two large tendons for shutting them; but in vain look for those destined to open them. When the mussel wishes to open itself, it relaxes the two muscles or tendons, and swells the fringes, which act as wedges to separate the shells. The animal shuts up itself by contracting two thick fibrous muscles, fixed internally to each end of the shells, which are lined all around with a membrane or epidermis, uniting them so when soaked in water, that not the smallest drop can escape. When mussels walk they raise themselves on the sharp edge of their shells, and put forth a fleshy substance susceptible of extension, which serves as a leg to drag themselves along, in a kind of groove or furrow, in the mud, which supports the shell on both sides. In ponds, these furrows are very observable. From the same member or leg hang the threads by which the animals fasten themselves to objects.

Mussels are all androgynous; and from a peculiar generative organization, each individual of itself can, and annually does, propagate its species, without the intercourse of any other.*

The parts of generation are two ovaries and two seminal vessicles each having its proper duct; through these four channels the eggs and the seed are conveyed to the anus, where those two principles unite at their issue, which answers the purpose of generation, and, in the spring, they lay their eggs, none being found in them but in winter.†

* This is altogether singular, and different from what takes place in snails, earth-worms, and other hydrogenous animals; for though each individual of those contains the parts of both sexes, yet there is always a congress of two animals for the propagation of the species.

† Leeuwenhoek, in several mussels which he dissected, discovered numbers of eggs or embryo mussels in the ovarium, all lying with their sharp ends fastened to the vessels by which they receive nourishment.

The mussel has several enemies in its own element; in particular it is the prey of a small shell-fish of the trochus kind, which attaches itself to the shell of the mussel, pierces it, and introduces a tube five or six lines long, which it turns in a spiral direction, and sucks the substance of the mussel. Mussels are also subject to certain diseases, supposed to cause those bad effects sometimes happening from eating them. These are stated to be the moss and the scab. The roots of moss being introduced into the shell, the water penetrates through the openings, and gradually dissolves the mussel. The scab is a sort of tubercles, produced by the dissolution of the shell. Certain small crabs, sometimes found in mussels, likewise tend to make them unwholesome.

The eating of mussels has sometimes produced erysipelatous inflammations, cutaneous eruptions, insupportable itching all over the body, great restlessness and agitation; and though these complaints are easily removed by oil, milk, and emetics, and seldom or never prove mortal, yet they have an alarming aspect, and make the patient suffer grievously. These noxious effects have been supposed owing to the mussels or part of them having been diseased. Some authors pretend that these effects take place only between the vernal and autumnal equinox, and recommend abstinence from mussels during May, June, July, and August.

Upon the whole, the edulis, or eatable mussel, though a rich food, is difficult of digestion; in its best state it is noxious to some constitutions; and when affected by disease, is in some degree poisonous. Mussels do most

ishment. These minute embryos are placed in due order, and very close arrangement, outside the shell, to which, by a gluey matter, they adhere, and continually increase in size and strength, till becoming perfect mussels, they fall off and shift for themselves, leaving the holes where they were placed. This abundance the mussel-shells plainly show, by the microscope, sometimes even two or three thousand in one shell: but it is not certain that all have been fixed there by the mussel within; for these fish usually lying in great numbers, the embryos of one are often affixed to the shell of another. The beard, or fringed edge of the mussel, has in its minutest part a varied motion not easily conceivable, being composed of longish fibres, each having on both sides many moving articles,

harm when eaten raw. They ought always to be boiled, with onions, well washed with vinegar, and seasoned with pepper, and even thus qualified, should not be eaten to excess, or too frequently.

THE COCKLE, (*Cardium*.)

THE animal is a tethys: shell nearly equilateral, with equal valves, longitudinally ribbed, striated, or sulcated, the margin dentated; two teeth in the middle of the hinge, alternate, one of them commonly incurved, teeth at the sides remote, and inserted into each other. The animals live under the surface of the sand, near the shore, not deep, because they cannot project far the short tubes by which they perpetually draw in and throw out the water. The edule, or common cockle, is common on all sandy coasts, at low water, about three inches deep, the spot being a little depressed. Different species are found in various parts of the kingdom, of various sizes.

Cockles are perhaps eaten more generally in England than in any other country; and when boiled they are a wholesome, and to many persons an agreeable food; but if eaten raw, they are supposed to have a poisonous effect. They are chiefly in request during the winter months; are sometimes pickled, or converted into ketchup.

THE PEARL MYA.

THE pearl mya (*margaritifera*) has a very long, coarse, opaque shell, often much decorticated, oblong, bending inward on one side, or arcuated, black on the outside; usual breadth from five to six inches, length two and a quarter. It inhabits great rivers, especially those which water the mountainous parts of Great Britain.—This shell is noted for producing quantities of pearl.

There have been regular fisheries for the sake of this precious article in several of our rivers. Sixteen have been found in one shell. They are the disease of the fish, analogous to the stone in the human body. On being squeezed they will eject the pearl, and often cast it spontaneously in the sand of the stream. Camden says the river Conway was noted for them. It is also said, that Sir Richard Wynne, of Gwydir, chamberlain

to Catherine, queen to Charles II., presented her majesty with a pearl taken in that river, to this day honoured with a place in the regal crown. They are called by the Welsh *cregin diluw*, or, "deluge shells," as if left there by the flood. The Irt, in Cumberland, was also productive of them; and the famous circumnavigator, Sir John Hawkins, had a patent for fishing in that river. He had observed pearls plentiful in the Straits of Magellan; and flattered himself with being enriched by procuring them at home. In the last century, several of great size were found in the rivers of Tyrone and Donegal, in Ireland. One weighing thirty-six carats was valued at forty pounds, but being foul, lost much of its worth. Other single pearls were sold from four pounds ten shillings even to ten pounds. The last was sold a second time to Lady Glenlealy, who put it into a necklace, and refused eighty pounds for it from the Duchess of Ormond. Suetonius reports, that Cæsar was induced to undertake his British expedition for the sake of our pearls, which were so large, that it was necessary to use the hand to try the weight of a single one. Pennant supposes Cæsar only heard this by report, and that the crystalline balls, called mineral pearl, were mistaken for them. We believe that Cæsar was disappointed, yet we found he brought home a buckler made with British pearl, which he dedicated to, and hung up in, the temple of Venus Genetrix; a proper offering to the goddess of beauty, who sprung from the sea. It may not be improper to mention, that although the classics honour our pearl with their notice, yet they report them to have been small and ill-coloured, which imputation they, in general, are still liable to. Pliny says, a red small kind was found about the Thracian Bosphorus, in a shell called *mya*, but he does not give any mark to ascertain the species.

Linnæus made a remarkable discovery relating to the generation of pearls in this fish. The fish will bear removal remarkably well; and in some places they form reservoirs to keep it, and taking out the pearl, which, in a certain time, will be again renewed. From observations on the growth of their shells, and the number of their annual lamina, or scales, it is supposed the fish will attain a great age; fifty or sixty years are imagined to

be a moderate computation. Linnæus discovered a method of putting these shell-fish into a state of producing pearls at pleasure, though the final effect did not take place for several years; he says, that in five or six years after the operation, the pearl would have acquired the size of a vetch. We are ignorant how he accomplished this extraordinary operation; but it was probably published then, and considered as important; as the author was rewarded, on this account, with a munificent premium from the states of the kingdom. It is probable, from a paper published many years afterwards in the Berlin Acts, that the method consisted in injuring the shell externally, perhaps by a perforation! as it has been observed, that these concretions in shell-fish are found on the inside, exactly opposite to perforations and injuries made from without by serpulæ and other animals.

SOLEEN, RAZOR-SHEATH, OR KNIFE-HANDLE SHELL.

THE animal is an ascidia. The shell is bivalve, oblong, and opening at both sides: the hinge has an awl-shaped tooth, bent back, often double, not inserted into the opposite shell; the rim at the sides a little worn, having a horny cartilaginous hinge. Three species, the *siliqua*, *vagina*, and *ensis*, are found on the British coast, and lurk in a perpendicular direction, in the sand near the low-water mark. When in want of food they elevate one end a little above the surface, and protrude their bodies far out of the shell.*

* They are said to be incapable of moving forward horizontally on the surface; but each digs a hole, sometimes two feet deep, in the sand, in which it can ascend or descend at pleasure, or on the approach of danger. The leg, by which it performs all its movements, is fleshy, cylindrical, and long; and the animal can make it assume the form of a ball. When lying on the surface of the sand, and about to sink into it, the leg is extended from the inferior end of the shell, and the extremity assumes the form of a shovel, sharp on each side, and terminating in a point. With this instrument the animal makes a hole in the sand; after which it advances the leg still farther into it, makes it assume the form of a hook, and with this, as a fulcrum, it obliges the shell to descend into the hole; and this operation is continued until the whole shell is covered. When the animal wishes to regain the surface, it makes the extremity assume the form of a ball, and makes an

Their place is known by a small dimple on the surface. Sometimes they are dug out with a shovel; at others they are taken by striking a barbed dart suddenly into them. When the sea is down, these fish usually run deep into the sand; and to bring them up, the common custom is to throw a little salt into the holes, on which the fish raises itself, and in a few minutes appears at the mouth of its hole. When half the shell is discovered, the fisherman must instantly take hold of it with his fingers and draw it out; for the creature does not continue a moment in that state; and, if the fisherman touches it, and lets it slip away, it is gone for ever; as it will not be decoyed again out of its hole by salt; and there is then no way of getting it but by digging under it, and throwing it up with the sand. The fish has two pipes, each composed of four or five unequal portions of a hollow cylinder, and their places of joining are marked by a number of fine streaks or rays. The salt makes these creatures come up out of their holes, by causing violent pain, as it even corrodes the pipes. This is strange, as the creature is nourished by salt-water; but it is certain, that a little salt strewed on these pipes in a fish taken out of its habitation, will corrode the joinings of the rings, and often make one or more joints drop off: the creature, to avoid this mischief, rises out of its hole, throws off the salt, and instantly retires back again. The use of these pipes to the animal, is the same with that of many similar pipes in other shell-fish; they all serve to take in water; are only a continuation of the outer membrane of the fish, and serve one for taking in, and the other for throwing out, the water, and either answering equally well to their purpose.

This fish was used as food by the ancients; and Athenæus, from Sophron, speaks of it as a great delicacy, and particularly grateful to widows. It is often used as food, at present, and is brought up to table fried in eggs.

effort to extend it. The ball prevents any farther descent, and the reaction of the muscular effort raises up the whole shell; which operation is continued until it reaches the surface; and it is surprising with what facility these motions are accomplished, by an animal seemingly so little qualified to move.

ACTINIA.

THE body is oblong and smooth, attaching itself firmly by its basis to rocks or other solid substances, having a dilatable apex nooked within. The mouth is furnished with crooked teeth, the rostrum cylindrical and radiated. Progressive motion in these creatures is so slow, that it is difficult to perceive any, as they scarce advance the length of one inch in an hour. They do not all produce, when handled, the painful sensation of the sea-nettle, or sea-anemone. They are viviparous, feed on shell-fish, open their mouths according to the size of their prey, and then reject the shell through the same aperture.—When the mouth is open all the tentacula may be seen, resembling a full-blown flower, whence the denomination of the flower-fish.

ANIMAL FLOWER, SEA-NETTLE, OR SEA-ANEMONE.

THE former name, from a supposed property of stinging, and the other from the claws or tentacles being disposed in regular circles, and tinged with various bright lively colours, resembling the petals of some of our most beautiful flowers. Of one species the brilliancy is not to be equalled by the purest white, carmine, and ultra-marine. Some of the bodies are hemispherical, others cylindrical, and others fig-shaped; and their substance likewise differs; some being stiff and gelatinous, others fleshy and muscular; but all capable of altering their shape, when they extend their bodies and claws in search of food. They are found on many rocky coasts, and fix themselves to the rocks at their lower extremity, but they are capable of slow progressive motion. They have only one opening, in the centre of the uppermost part, round which are rows of fleshy claws; this is the animal's mouth, and is capable of great extension.

The animals, though very voracious, will bear long fasting, and may be preserved alive a year, or longer, in a vessel of sea-water, without any visible food; but, when food is presented, one of them will in succession devour two mussels in their shells, or even swallow whole a crab, as large as a hen's egg. In a day or two, the crab-shell is voided at the mouth, perfectly cleared

of all the meat. The mussel-shells are likewise discharged whole, the two shells joined, but so entirely empty that not the least particle of fish is to be perceived on opening them. An anemone of one species will even swallow an individual of another, but after retaining it ten or twelve hours, will throw it up alive and uninjured. Through this opening also it produces its young alive, and furnished with little claws, which when they fix themselves, they extend in search of food.

A particular species, called the *actinia sociata*, or cluster animal-flower, has been described by Mr. Ellis. This compound animal, of a tender fleshy substance, consists of many tubular bodies swelling gently towards the upper part, and ending like a bulb, or very small onion. On the top of each is its mouth, surrounded by one or two rows of tentacles, or claws, which, when contracted, look like circles of beads. The lower part has a communication with a firm fleshy wrinkled tube, which fastens to the rocks, and other fleshy tubes creep along them in various directions, full of different sizes of these remarkable animals, which rise up irregularly in groups near each other.

On viewing the inside of this animal, dissected lengthwise, a little tube leads from the mouth to the stomach, whence, in a circular order, there arise eight wrinkled small guts, with a yellowish soft substance in them, which bend over, like arches, towards the lower part of the bulb, whence they may be traced downwards, to the narrow part of the upright tube, till they come to the fleshy adhering tube, where some may be perceived entering into the papilla, or the beginning of an animal of the like kind, most probably to convey it nourishment till it is provided with claws; the remaining parts of these slender guts are continued on in the fleshy tube for the same purpose, of producing and supporting more young ones from the same common parent. The many longitudinal fibres lying parallel to each other, on the inside of the semi-transparent skin, are all inserted in the several claws round the animal's mouth, and are plainly the tendons of the muscles, for moving and directing the claws at the will of the animal; these may be likewise traced down to the adhering tube.

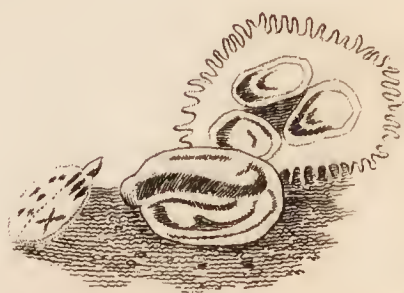


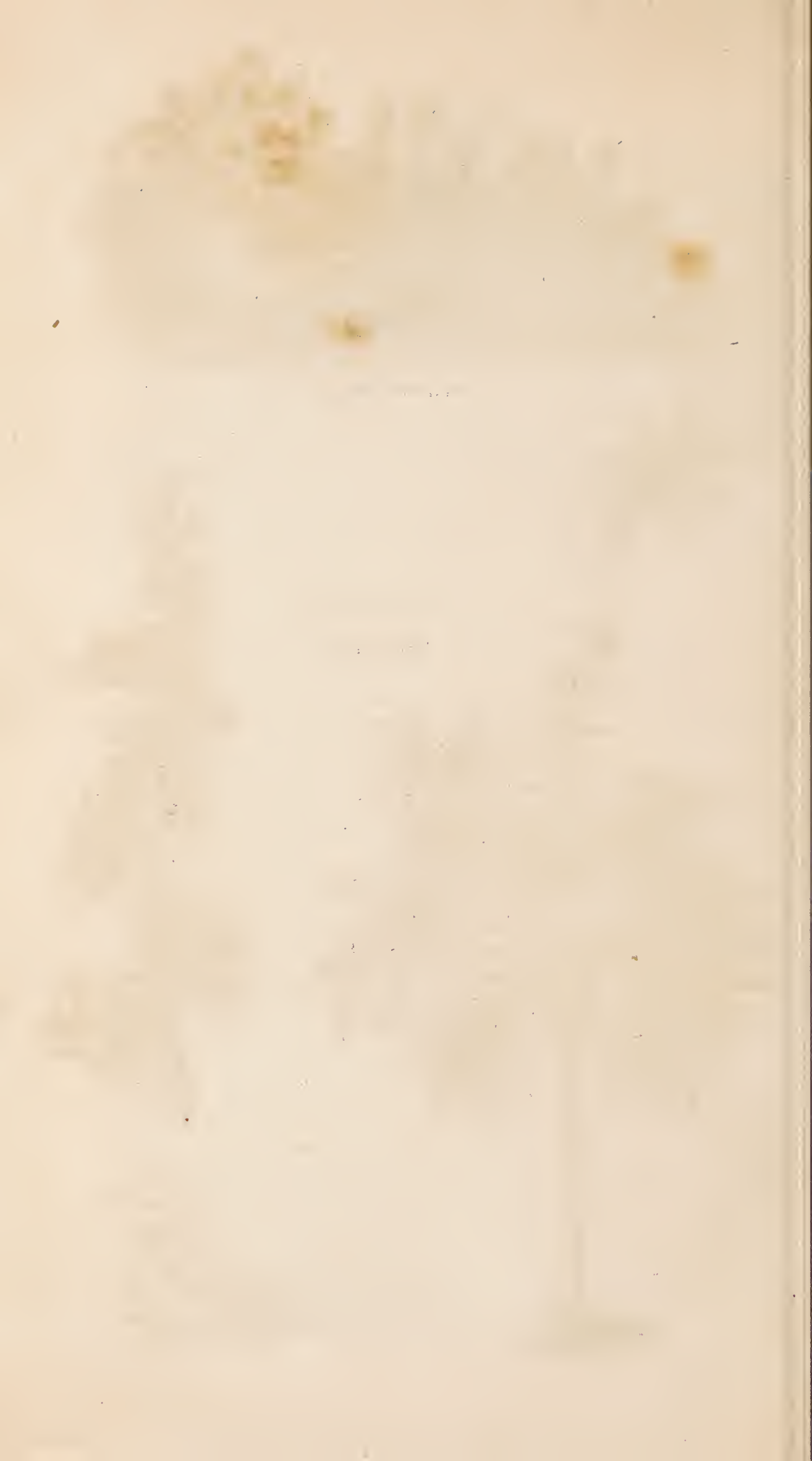
Animal Flowers



CASTOR TREE.

(Ricinus)





MEDUSA, SEA-NETTLES.

THE body is gelatinous, roundish, and depressed; the mouth in the centre of the under part of the body.—Many species, on being handled, affect with a nettle-like burning, and excite a redness.* Hence those animals are called sea-nettles, or medusæ; though extremely slow in their motions, are nevertheless capable of locomotion at pleasure. Their varied figure renders it difficult to assign them any determinate one; yet they mostly resemble a truncated cone, whose base is applied to the rock to which they adhere. Their colours are whitish, brown, red, or green; the mouth is very large, and when opened, appears surrounded with filaments resembling the horns of snails, which being disposed around in three rows, give the animal the appearance of a flower; and through every one the animal can squirt the sea-water. These animals swim in large companies in search of food, with their tentacula in continual motion; they vary in size, the largest being generally about eight inches in diameter; they extend their filaments and quickly entangle any small animals that come within their reach. The prey is instantly swallowed, and the mouth closed upon it like a purse, in which state it remains for many days before the nutritive parts are extracted. The animal, though scarcely an inch, or an inch and a half in diameter, is nevertheless so dilatable, that it can swallow large whelks and muscles, the shells of which are thrown out by the mouth, after the nutritive parts have been exhausted. Sometimes the shell is too large to be so voided; and then the body splits, and the shell is

* The ancients, and some of the moderns, add, that they have an aphrodisiac property. The Greeks and Romans attributed medicinal virtues to them. Dioscorides informs us, that, if rubbed fresh on the diseased part, they cured the gout in the feet, and kided heels. Ælian says, that they were depilatory; and, if macerated in vinegar, would take away the beard. Their phosphoric quality is well known; nor was it overlooked by the ancients. Pliny observes, that if rubbed with a stick it will appear to burn, and the wood to shine all over; and, also, that when they sink to the bottom of the sea, they portend a continuance of bad weather.

voided through the opening, which soon heals up again. The progressive motion of this creature is so slow, as to resemble that of the hour-hand of a clock, and is performed by innumerable muscles outside the body; all tubular, and filled with a fluid, making them project like prickles. It can loosen the base of the cone from the rock, and inverting its body, move by the filaments around the mouth; but this motion is as slow as the other.

1. The AURITED MEDUSA, (*aurita*,) sometimes appears floating on the water, like a mere lifeless lump of jelly. It is whitish, with a blueish-grey cast, orbiculated, elevated into a convexity in the middle on the upper side, flat on the under, and furnished with a fringe of fine and rather rigid filaments round the edge, resembling white hairs; on the under surface are four cavities near the centre, each arcuated, and surrounded with an opaque line, of about twenty-four parallel dots; from the very centre of the under side arise four crooked appendages, which have each a row of hairy filaments on the exterior edge; and on the upper surface is an appearance of fine vessels. This species is frequent, floating on the surface of the sea, or adhering to rocks about our own coasts; and when the sun shines on them, they have a very beautiful lucid appearance. It is called by some the sea-nettle, being one of those animals, when touched, which occasions a very disagreeable tingling in the hands.

2. The CAPILLATED MEDUSA, (*capillata*,) is a very singular and odd animal; it seems a mere lump of a whitish semi-pellucid jelly! and is as easily broken and destroyed by a touch, as the common jellies brought to our tables; its shape is rounded, rising into a convexity in the middle, where it is therefore thickest, and whence it becomes gradually thinner to the sides; on the under side it is plain, and there is visible a rough, or echinated circle, within which run eight pairs of rays from the centre toward the circumference; and from the centre also arise a number of curled appendages, sometimes reddish, but more usually whitish, and a vast number of slender filaments; the edge of the circumference of the body is regularly divided into eight portions, each emarginated, so that on the whole verge

are sixteen sinuses. This species is met with in vast abundance floating on the surface of the water about the isle of Sheppey, in Kent, and elsewhere on that coast; great quantities are destroyed by being thrown ashore with the waves, whence it has no power of getting off again; and in the open seas many fish skim near the surface, and prey on them. This is also called *pulmo marinus*, or the sea-lungs.

3. The PURSE MEDUSA, (*marsupialis*), is semi-oval with four tentacula on the edge. It inhabits the Mediterranean.

4. The WAVED MEDUSA has the edges waved, with fangs on the projecting parts; four orifices beneath, between which rises a stem divided into eight large ragged tentacula.

Mr. Banks, in his passage from Madeira to Rio Janeiro, discovered a new species, which, when brought aboard by the casting net, had the appearance of metal violently heated, and emitted a white light. With these animals were taken small crabs, of three different species, altogether new, each of which gave as much light as the glow-worm, though the creature was not so large by nine-tenths. These luminous animals are one of the causes of that appearance to the sea which has been mentioned by many navigators, and of which various reasons have been assigned. It appeared to emit flashes of light, exactly resembling those of lightning, only less considerable; but so frequent that sometimes eight or ten were visible at the same moment.

INSECTS.

LECTURE LXX.

THE SPARKLER, (*Cicindela*.) (See Vol. II.)

THE *C. sylvatica* is obscuraneous above; each elytron has an external lunule at the base, with a mark at the apex, and an intermediate transverse white narrow sinuated band; with many impressed punctures at the suture. It is very common near Cobham and Godalming, in Surrey; near Christchurch, Hants; and Martlesome Heath, Suffolk. The other native species are—the *C. hybrida*, found on the sea-shore near Swansea and Yarmouth; and the *C. Germanica*, common in June and July, in chalk pits, near Dartford; and at Black Gangway, in the Isle of Wight.

The *Brachinus*, (*Carabus*, Vol. II.) has the lip with the tooth of its notch wanting; labrum scarcely emarginate; labial palpi with their fourth joint rounded, oval. Inhabits under stones, common near Gravesend, and also under clods in ploughed fields in May. It is said to beat off the larger carabi, by a discharge of wind from the abdomen.

The *Lamprias Cyanocephalus* has the tarsi with their fourth joint simple, antennæ linear, wings short. It is of an intense blue green; thorax, thighs, libiæ, and first joint of antennæ red; elytra with punctured striæ; knees black. It is very rare in Britain. The *L. chlo-rocephala* is of an intense green; red like the preceding, tarsi black. It is very common in Coombe Wood, near London, under the bark of trees, and among broom.

The *Staphylinus Nitiadalus* is black, the margins of the thorax yellowish, the elytra ferruginous, with a black margin. (See Vol. II.) The family is very extensive, and they inhabit fungi in all its states, dung-roots of grass, flowers, and under the bark of trees; and

may be found in immense numbers in sand-pits, and in the dung of animals, whence they may be driven in the summer months by immersion in water.

The *ptinus*; antennæ much longer than the head, filiform, or terminated by three large joints, not united into a mass. Of a brick colour, thorax nearly round, with four dents, receiving the head under it; the elytra with two white fasciæ.

The *P. pertinax* destroys furniture, particularly that made of oak, piercing it with innumerable holes, thus occasioning its gradual destruction. When taken it contracts itself, and remains motionless, as if dead, nor can any torture force it to flee.

The *P. fur* is a most destructive insect in museums, consuming plants, insects, birds, skins, books, and furniture; nor will snuff or camphor deter its ravages. It is fond of cold and moisture; is expelled by heat and dryness; and may be killed by arsenic and alum, or corrosive sublimate.

The *P. fatidiculus* is the true DEATH-WATCH, famous for a ticking noise, like the beat of a watch, which superstitious people take for a presage of death in the family where it is heard. It is small, 5-16ths of an inch long, of a dark-brown colour, spotted; having pellucid wings under the vagina, a large cap or helmet on the head, and two antennæ proceeding from beneath the eyes, and doing the office of proboscides. The part it beats with is the extreme edge of the face, or upper lip, the mouth being protracted by this bony part, and lying underneath out of view. This is confirmed by Dr. Derham; only instead of ticking with the upper-lip, he observed the insect to draw back its mouth, and beat with its forehead. He had two death-watches, a male and a female, which he kept alive in a box several months, and could bring the male to beat, whenever he pleased, by imitating its beating. By this ticking noise he could frequently invite the male to coition with the other. When the male found he got up in vain, he would get off again, beat very eagerly, and then up again; whence the author concludes those pulsations to be the way whereby these insects woo each other, and find out and invite to copulation.

THE FIRE-FLY, (*Lampyrus*.)

THE antennæ are filiform; the elytra flexible; the thorax flat, semiorbicular, surrounding and concealing the head: the segments of the abdomen terminate in papillæ, turned up towards the elytra, and partly folds one over the other. The females are mostly without wings.

Sweet child of stillness, mid the awful calm
Of pausing Nature thou art pleased to dwell,
In happy silence to enjoy thy balm,
And shed through life a lustre round thy cell.

The species most remarkable, is the noctiluca. The male is less than the female; its head is shaped exactly similar, and covered likewise by the plate of the thorax, only it appears rather longer than that of the female. The head and antennæ are black; the thorax of the male, smaller and shorter than that of the female, has the folds and papillæ on its sides less remarkable; but the greatest difference between the sexes is, the male is covered with brown elytra, shagreened and marked with two lines longitudinally longer than the abdomen, and under them lie the wings. The two last rings of the abdomen are not so bright as those of the female, only four luminous points appear, two upon each of the two last rings.

The insect called glow-worm, common towards evening in June, in woods and meadows, is the female of this species.

When evening closes Nature's eye,
The glow-worm lights her little spark,
To captivate her favourite fly,
And tempt the rover through the dark.

Conducted by a sweeter star
Than all that deck the fields above,
He fondly hastens from afar,
To sooth her solitude with love.

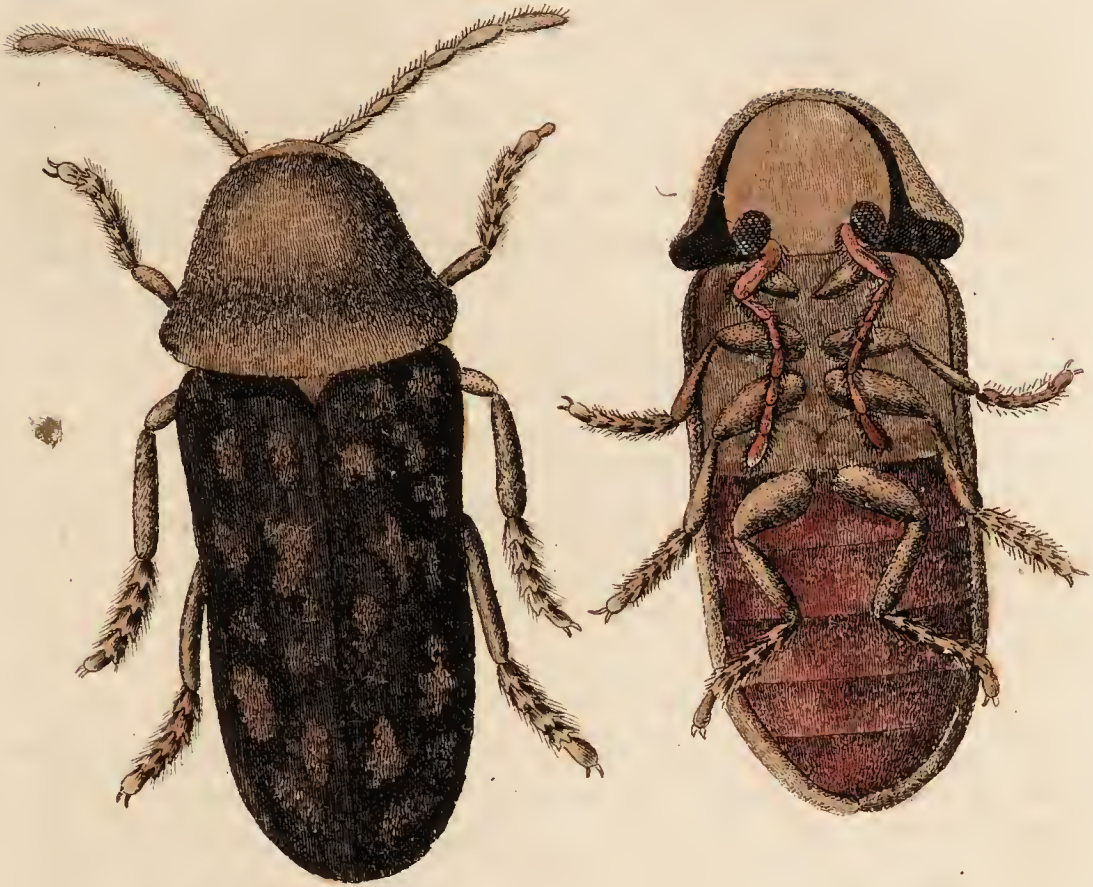
The shining light it emits, attracts the male; a wonderful instance of divine Providence. This shining light proceeds from one or two of the last segments of the abdomen; depends on a liquor placed at the lower extremity of the insect; which, when in motion, the light is more lively and shining, and of a finer green.

BEATING PTINUS

OR

DEATH WATCH.

magnified



natural size



MEDUSA

Neele & Son, 55

This light the insect withdraws, either by unfolding or contracting itself. As a proof that the light depends on a phosphorous matter, you may crush the animal, which, though dead and bruised, leaves on the hand a luminous substance, that only loses its lustre when dried. The perfect insect flies about during the evening in autumn, and frequents the grassy plantations of juniper-trees.

“ You with light gas the lamps nocturnal feed,
That dance and glimmer on the marshy mead ;
Shine round *Calendula* at twilight hours,
And tip with silver all her saffron flowers ;
Warm on her mossy couch the radiant worm,
Guard from cold dews, her love-illumined form,
From leaf to leaf conduct the virgin light,
Star of the earth, and diamond of the night !”

THE NITIDULA.

MANDIBLES prominent, body short, depressed ; back plain ; thorax rough, generally broad ; antennæ with the third joint twice as long as the second ; club abrupt and orbicular, of three joints ; brown, and the elytra dark bronze, with four elevated fasciæ. Found in stagnant waters among *confervæ* : others are found in flowers, carcasses, and dried bones.

THE HYDROPHILUS PICEUS, (See Vol. II.)

Is black, the sternum channelled, and spiry behind. This is the largest of the kind ; the larvæ live in still waters and ponds, about an inch and half long, black, the head smooth and chesnut-coloured ; with six slender feet, apparently placed on the back, and a tapering tail, through which it respire. In July, having attained its utmost size, it quits the water, creeps along the dry ground to a heap of dung, beneath which it makes a deep hole, so wide that it can therein roll itself in a circle, and go into its pupa state. About the middle of August, the perfect insect appears ; elytra smooth, scarcely striated ; the last articulation of the antennæ black and smooth, the rest not so, and brown. The eggs are inclosed in a floating net, with a long tapering point. Like most other aquatic insects it lives through the winter, diving deep into the mud in the most inclement weather.

THE STAG-BEETLE, (*Lucanus*.)

THE antennæ end in a knob, compressed on one side, and divided into short laminæ, resembling the teeth of a comb; the jaws dentated, are porrected before the head. The largest and the most singular, is the *cervus*; easily known by two large moveable maxillæ, resembling the horns of a stag, which project from its head; whence the appellation of Stag-Beetle. Those maxillæ, broad and flat, one third the insect's length, have in the middle, towards their inner part, a small branch, and are at their extremity forked; they also have several small teeth throughout their whole length. The head very irregular, broad, and short. The thorax margined, narrower than the head and body; the elytra very plain, without either streaks or lines. The whole animal is of a deep brown colour. It is commonly found upon the oak, but is scarce in the neighbourhood of London; and though the largest of coleopterous insects met with in this country, it is much smaller than the same species found in woody countries. This creature is strong and vigorous, and its horns, with which it pinches severely, are carefully to be avoided.—The jaws, sometimes as red as coral, give it a very beautiful appearance; but in the female, the jaws are not half so long as in the male. They suck, with their trunk or tongue, the liquor which oozes from oaks. The females deposit their eggs in the trunks of decayed trees. The larvæ are white, lodge under the bark, particularly of decayed oak-trees, which they eat into and reduce into fine powder, and there transform themselves into chrysalids. They are common in Kent, Sussex, and some other parts of England. Their porrected jaws are particularly useful in stripping the bark from trees, and affixing themselves thereby to the tree, while they suck with their trunk the juice that oozes forth.

THE COCK-CHAFER, (*Melolontha*.)

THIS insect has a scutellum; without horns, of a brick colour; elytra with their external edge not sinuated, very slightly narrower at their base, than points; tibia

armed with very distinct heels; the thorax villous, the tail inflected; the incisures of the abdomen white.

The cock-chaffer flies in the evening, and lives on the leaves of trees, especially the maple, but not the lime; when numerous in autumn, they are supposed to presage diseases; oil in which they have been infused expel bugs; it is eaten by turkies and bats; and is a favourite food of crows and sea-gulls, which greedily devour the larva when turned up by the plough. The female digs a hole about six inches deep, wherein she deposits her eggs, whence proceed larvæ with six legs, whitish, which prey on the roots of plants, especially corn, for four years, changing their skin once a-year. In winter they go deeper into the soil, to preserve themselves from the cold, and during that time are without food. At the end of the fourth year, sometimes two yards deep, they go into the pupa state, and continue till February, when the perfect insect appears, but does not leave its abode till May. In flying, as it often strikes against objects, it has been supposed blind, and has originated the proverb—‘as blind as a beetle.’ They sometimes are so numerous, and their ravages on the vegetable produce so calamitous, as to resemble those of locusts; and mention is made, that in a space of two miles square, their flight has darkened the air, and falling in a river they have choked up and prevented mills from working.

THE MORDELLA.

HEAD cordiform, abruptly strelongated at its junction with the thorax; hinder tarsi (sometimes the others) with their penultimate joint entire; body elevated, arcuate, laterally compressed, and terminated by a point; head very large; elytra very short, or very narrow and pointed behind; hinder feet large; tibiæ with spurs; tarsi with all their joints simple; muscillary palpi terminated by a securiform joint; antennæ simple, or slightly serrated; scutellum distinct. Inhabits the blossoms of the crab-tree, white thorn, &c.

THE MEAL-WORM, (*Tenebrio*.)

THORAX behind as broad as the elytra, with slight convexity, and marginated; head standing out; body elongate; antennæ scarcely gradually thicker towards their extremities; the last joint sub-globose; mentum rather quadrate, upper margin rounded; maxillary palpi, with their last joint, thick.

These insects fly little, many being without wings; but they run easily, and mostly emit a very fetid smell, whence the name of *stinking* beetles. Their larvæ hide themselves under ground, where they operate their transformations; some are found under

heaps of weeds, branches of trees, and other refuse of gardens; and that of *T. melitor*, called *meal-worm*, is found in meal, in bake-houses, dry bread, &c. of a pale colour, with thirteen segments, soft. These insects are a very favourite food of nightingales, and other motacillæ.

SLOW-LEGGED BEETLE, (*Pimelia*.)

ANTENNÆ filiform; palpi four; thorax with little convexity, and marginated; head standing out; elytra rather rigid; wings frequently absent. The *P. mortisaga*, is black; coleoptra ending in a point and smooth.

This walks slowly, and is therefore called the slow-legged beetle; when taken it emits a colourless, but very fetid liquor. It is often found in moist places, about churches, &c. The male has an exserted penis, long, slender, and twisted like the tendril of a vine.—Mr. H. Baker mentions, (Phil. Trans. 457,) that he had one, which, after repeated immersion into spirits of wine, and sometimes lying a whole night therein, (though it soon kills most other insects,) always revived, and lived with him three years, without any food whatever, and at last made its escape.

Observe the insect race, ordain'd to keep
The lazy sabbath of a half-year's sleep.
Entomb'd beneath the filmy web they lie,
And wait the influence of a kinder sky.
When vernal sun-beams pierce their dark retreat
The heaving tomb distends with vital heat;
The full-form'd brood, impatient of their cell,
Start from their trance, and burst their silken she
Trembling awhile they stand, and scarcely dare
To launch at once upon the untried air.
At length assur'd they catch the fav'ring gale
And leave their sordid spoils, and high in æther sail.

The WEEVIL, (*curculio*,) Vol. II. Of a light black colour; thorax punctured, of the same length with the elytra. It is a small but most destructive insect in granaries; and is said to be extirpated by the

TURNIP FLY, (*chrysomela oleracea*,) of a blueish green colour. The largest British species. Antennæ black; thighs of the hind legs strong and thick, formed for leaping; appears early in spring. Found on the tetradynamia class of plants, the seminal leaves of which it destroys; but perhaps might be prevented, if the seeds were, before being sown, immersed in a deco-

tion of tobacco. This is that very pernicious insect, the turnip-fly, which devours turnips and many crops in the garden, destroying often whole fields, while in their seedling leaves. In very hot summers they abound, and on walking in a field or garden, may be heard making a pattering like rain, by jumping on the leaves of turnips or cabbages.

LADY-COW, OR LADY-BIRD, (*Coccinella*.)

THE antennæ are clatrated, shorter than the thorax, which (even behind) is narrower than the elytra, both these marginated; maxillary palpi terminated by a large securiform joint; body hemispheric, approaching to ovate. The females, after impregnation, deposit their eggs of an oblong form, and amber colour, which turn to small larvæ, of slow progression, but determined enemies to the aphids, or plant-louse, hence very serviceable in clearing vegetables of myriads which else would destroy them. When near their metamorphosis, they settle on a leaf, then bend, swell, and form a hooked figure; the skin hardens, and in about fourteen days the chrysalis opens along the back. The insect, when perfect, receives the impressions of the air, which give its elytra greater consistence. It seldom flies, and cannot keep long on the wing.

The most singular species is the white hedgehog, so called because of its peculiar form and tufts of hair, it feeds on the leaves of trees; after a fortnight, it settles on one spot, and without parting with its fur, becomes a chrysalis, and in twenty days after, a coccinella. The slough is not injured by its transformation. It is found on the rose-tree.

When the coccinella arrive at perfection, the colours of their elytra are very pale, almost cream-colour, or whitish, and they are very soft and tender, but soon harden, and change to a very brilliant colour.

Lo the bright train their radiant wings unfold,
With silver fringed, and freckled o'er with gold.
On the gay bosom of some fragrant flower
They idly flutt'ring live their little hour,
Their life all pleasure, and their task all play,
All spring their age, and sun-shine all their day.
Not so the child of sorrow, wretched man:
His course with toil concludes, with pain began,

That his high destiny he might discern,
 And in misfortune's school this lesson learn,—
 Pleasure's the portion of th' inferior kind;
 But glory, virtue, Heaven for man design'd.

EAR-WIG, (*Forficula*.)

THE antennæ, of fourteen joints, are bristly; the elytra are dimidiated; the wings are covered, but very large in proportion to the body; and the tail is forked.—There are two species, namely, the auricularia, or common ear-wig, with the tops of the elytra white; and the minor, with testaceous and unspotted elytra. This genus of insects is one of the best known, the forceps at the extremity of their abdomen forming a very distinctive character. It is this seeming weapon that has occasioned those insects to be called forficulæ in Latin; and the formidable name of ear-wig has been given them in English, from the fable that the insect frequently introduces itself by the ears to the brain, causing great pain, and even death. But the forceps which the ear-wig carries at his tail, and with which he seems provided for his defence, is not so formidable as it at first appears, being destitute of strength sufficient to produce the least sensible impression. The larva of the ear-wig differs very little from the perfect insect. Ear-wigs are very mischievous in gardens, especially where carnations are preserved; for they are so fond of these flowers, that if care is not taken to prevent them, they will entirely destroy them, by eating off the sweet part at the bottom of the petals. To prevent this, most people have stands erected, which have a bason of earth or lead round each supporter, which is constantly kept filled with water. Some hang the heads of tobacco-pipes, or the hollow claws of crabs and lobsters upon sticks in different parts of the garden, into which the ear-wigs get, and are then easily shaken out and destroyed.

It is greedily eaten by poultry; is said to sit on its eggs, and tend its young parentally; the larvæ run quickly, and are very like the perfect insect. If this be fact, it is a singular instance of incubation in the tribe of winged insects.

THE DOMESTIC AND THE FIELD GRYLLUS,

(Domesticus and Campestris.)

ARE one and the same species; only the former is paler and yellow, and the latter more brown. The antennæ are slender, and nearly equal to the body in length; the head is large and round, with two large eyes, and three smaller ones, yellow colour, placed higher on the edge of the depression, from whose centre originate the antennæ; the thorax is broad and short. In the males, the elytra are longer than the body, veined, rumped on the upper part, crossed and enfolding part of the abdomen, with a projecting angle, and at their base a pale-coloured band. In the females, the elytra leave one-third of the abdomen uncovered, and scarcely cross, all over of one colour, veined and not rumped; nor do they wrap round much of the abdomen underneath. The female carries at the extremity a hard spine, almost as long as the abdomen, thicker at the end, composed of two sheaths, which encompass two laminæ; serving to sink and deposit its eggs in the ground. Both the male and female have two pointed soft appendices at the extremity of the abdomen. Their hinder feet are large and long, and serve for leaping.

Towards sunset, the field gryllus, or cricket, likes best to appear out of its subterraneous habitation. These insects are so shy and cautious, that it is not easy to get a sight of them; for, feeling a person's footsteps as he advances, they stop short in the midst of their song, and retire backward nimbly into their burrows, where they lurk till all suspicion of danger is over. It was attempted to dig them out with a spade, without success; for either the bottom of the hole was inaccessible, terminating under a great stone; or else, in breaking up the ground, the poor insect was inadvertently squeezed to death. Out of one so bruised were taken a multitude of eggs, long, narrow, yellow, and covered with a tough skin: gentle means proved more successful; a pliant stalk of grass, gently insinuated into the caverns, will probe their windings to the bottom, and quickly bring out the inhabitant; and thus enable the humane enquirer to gratify his curiosity without injuring the object. Though furnished with long legs behind, and brawny thighs for

leaping, like grasshoppers, yet when driven from their holes, they show no activity, but crawl along shiftless, so as to be easily taken: and again, though provided with a curious apparatus of wings, yet they never exert them when there seems the greatest occasion. The males only make that shrilling noise, perhaps out of rivalry and emulation, like many other animals which exert some sprightly note during their breeding time; it is raised by a brisk friction of one wing against the other. They are solitary beings, living singly, male or female, each as it may happen; but there being a time when the sexes have intercourse, then the wings may be useful, perhaps during the night. When males meet, they will fight fiercely; as was evinced by some put into the crevices of a dry stone-wall, to settle. Though they seemed distressed by being taken out of their knowledge, yet the first that got possession of the chinks, seized with a vast row of serrated fangs on any that obtruded upon them. With their strong jaws, toothed like the shears of a lobster's claws, they perforate and round their curious regular cells, not having fore-claws to dig, like the mole-cricket. When taken in the hand, they never offer to defend themselves, though armed with such formidable weapons. Of such herbs as grow before the mouths of their burrows they eat indiscriminately; and, on a little platform just by, they drop their dung; and never, in the day-time, stir more than two or three inches from home. Sitting in the entrance of their caverns they chirp all night, as well as day, from the middle of May to the middle of July; in hot weather, when most vigorous, they make the hills echo; and in the stiller hours of darkness may be heard to a considerable distance. At first their notes are faint and inward; but become louder as the summer advances, and die away again by degrees.

In March the crickets appear at the mouth of their cells, which they open, bore, and shape elegantly. Most seen at that season, were in their pupa state, and had only the rudiments of wings, under a skin, which must be cast before the insect arrives at its perfect state; hence the old ones do not always survive the winter. In August their holes begin to be obliterated, and the insects are not seen till spring. It was attempted to trans-

plant a colony to a terrace in a garden, by boring deep holes in the sloping turf. The new inhabitants staid some time, and fed and sung; but wandered away by degrees, and were heard at a farther distance every morning; so that, on this emergency, they used their wings in attempting to return to the spot whence they were taken. One of these crickets, confined in a paper cage, set in the sun, and supplied with plants moistened with water, will feed and thrive, and become so merry and loud as to be irksome in the same room where a person is sitting; if the plants are not wetted, it will die.

Little inmate, full of mirth,
Chirping on my kitchen hearth;
Wheresoe'er be thine abode,
Always harbinger of good.

The HEARTH-CRICKET, or domestic *gryllus*, does not require to be sought after for examination, nor is shy like the other sort: it resides within our dwellings, intruding itself upon our notice. It delights in new-built houses; being, like the spider, pleased with the moisture of the walls; and the softness of the mortar enables them to burrow between the joints, and to open communication from one room to another. They are particularly fond of kitchens and bakers' ovens, on account of their perpetual warmth. Tender insects, that live abroad, either enjoy only the short period of one summer, or else doze away the cold uncomfortable months in profound slumbers; but these, residing as in a torrid zone, are always alert and merry; a good Christmas fire is to them like the heats of the dog-days. Though they are frequently heard by day, yet is their natural time of motion only in the night. As soon as it grows dusk, the chirping increases, and they come running forth, from the size of a flea to that of their full stature. From the burning atmosphere they inhabit, they are a thirsty race, and show a great propensity for liquids, being frequently found drowned in pans of water, milk, broth, or the like. Whatever is moist they attack; and therefore often gnaw holes in wet woollen stockings and aprons hung to the fire. They are not only very thirsty, but very voracious, will eat the scummings of pots, yeast, salt, crumbs of bread, and any kitchen offal or sweepings. In summer, they fly, at

dusk, out of the windows, and over the neighbouring roofs. This feat accounts for the sudden manner in which they often leave their haunts, and for their coming to houses where they were not known before.—Many sorts of insects use their wings only when they have a mind to move their quarters, and settle new colonies. When in the air they move in waves or curves, like wood-peckers, opening and shutting their wings at every stroke, and so are always rising or sinking. When they increase much they become noisome pests, flying into the candles, and dashing into people's faces; but may be blasted by gunpowder discharged into their crevices and crannies.

In families, at such times, they are like Pharaoh's plague of frogs; 'in their bed-chambers, and upon their beds, and in their ovens, and in their kneading troughs.' Their shrilling noise is occasioned by a brisk attrition of their wings. Cats catch hearth-crickets, and, playing with them as with mice, devour them.—Crickets may be destroyed, like wasps, by phials half filled with beer, or any liquid, and set in their haunts; for, being always eager to drink, they will crowd in till the bottles are full. A popular prejudice, however, frequently prevents their being driven away and destroyed; the common people foolishly imagine that their presence brings a kind of luck to the house while they are in it, and think it would be hazardous to destroy them.

Thou humm'st thy short and busy tune,
Unmindful of the blast;
And careless, while 'tis burning noon,
How quick that noon be past.

A show'r would lay thy beauty low,
A dew of twilight be
The torrent of thy overthrow,
Thy storm of destiny!

Then spread thy little shining wing,
Hum on thy busy lay!
For *Man*, like *thee*, has but his spring;
Like *thine*, it fades away.

MOLE-CRICKET, (*gryllus gryllotalpa*,) is of a very unpleasant form. Its head, in proportion to the size of its body, is small and oblong, with four long

thick palpi, and two long slender antennæ; behind which are the eyes, and between those three stemmata or lesser eyes, set in one transverse line. The thorax forms a kind of velvety cuirass, oblong and almost cylindrical. The elytra reach to the middle of the abdomen, crossed over, and have large brown nervous fibres. The wings terminate in a point, longer than the elytra and abdomen. This latter is soft, and ends in two appendices, but the chief singularity are its fore-feet, very large and flat, with broad legs, ending outwardly in four, and inwardly in two, large serrated claws, between which often is concealed the tarsus.—The animal is of a dusky brown colour. It haunts moist meadows, the sides of ponds and streams, performing all its functions in a swampy wet soil. With a pair of fore-feet, curiously adapted to the purpose, it burrows under ground, like the mole, raising a ridge as it proceeds, but seldom throwing up hillocks. As it often infests gardens by the sides of canals, it is an unwelcome guest to the gardener, raising up ridges, and rendering the walks unsightly. In kitchen-gardens it occasions great damage, by destroying whole beds of cabbages, young legumes, and flowers. When dug out it seems very slow and helpless, and makes no use of the wings by day; but at night comes abroad and makes long excursions. In fine weather, about the middle of April, at the close of day, the insects begin to solace themselves with a low, dull, jarring note, continued long without interruption, and like the chattering of the fern-owl, or goat-sucker, but more inward. About the beginning of May they lay their eggs. A gardener happening to be mowing, on the sixth of that month, by the side of a canal, his scythe struck too deep, pared off a large piece of turf, and laid open to view a curious scene of domestic economy. There were many caverns and winding passages leading to a kind of chamber, neatly smoothed and rounded, and about the size of a moderate snuff-box. Within this secret nursery were deposited near one hundred dirty yellow eggs, enveloped in a tough skin, too lately excluded to contain any rudiments of young, yet full of viscous substance. The eggs lay shallow, within the influence of the sun, under a little heap of fresh-mowed mould.

THE FROG-HOPPER, OR FLEA-LOCUST. (*Cicada*.)

THE beak is inflected, the antennæ setaceous; the four wings membranaceous and deflected, and the feet of the jumping kind. The larvæ evacuate great quantities of a frothy matter upon the branches and leaves of plants, in the midst of which they constantly reside. Nature has afforded this kind of defence to insects whose naked and soft bodies might otherwise very easily be injured; perhaps, also, the moisture of this foam may screen it from the sun's sultry beams. On removing the foam the larva is found underneath; but does not long remain uncovered; for it soon emits fresh foam, that hides it from observation. In the midst of this foamy substance it goes through its metamorphosis into a shrysalis and perfect insect. Other larvæ, whose bodies are not so soft, run over plants without any manner of defence, and escape insects that might hurt them, by their agility.

The chrysalids, and all the larvæ that produce them, differ little from each other, only that the former have the rudiments of wings, a kind of knob at the place where the wings will afterwards be in the perfect insect. As to other respects, the chrysalids walk, leap, and run over plants and trees; as do the larva and the frog-hopper, which they are to produce. At length they throw off their teguments of chrysalids, slip their last slough, and then the insect appears in its utmost state of perfection. The male alone is then endowed with the faculty of singing, which it exercises with an organ situated under the abdomen. Behind the legs of the male are two valves, which, raised up, discover several cavities, separated by various membranes. The middle contains a scaly triangle. Two vigorous muscles give motion to another membrane, which alternately becomes concave and convex. The air, agitated by this membrane, is modified within the other cavities; and by this sonorous instrument, he amorously solicits his female. Pulling the muscles of a frog-hopper, lately dead, make it sing. This insect begins its song early in the morning, and continues it during the heat of the noontide sun. Its lively and animated music, to the country people, presages a fine summer, a plentiful harvest, and the sure return of spring. The cicadæ have a head almost triangular, an oblong body, their

wings fastigated, or in form of a roof, and six legs, with which they walk and leap briskly. In the females, at the extremity of the abdomen, are two large laminae, between which is inclosed, as in a sheath, a spine, or lamina, serrated, which serves them for depositing their eggs, and to sink them into the substance of those plants which the young larvæ are to feed upon.

CHERMES.

THE rostrum is situated on the breast; the feelers are longer than the thorax; the four wings are deflected; the thorax is gibbous; and the feet are of the jumping kind. There are seventeen species; and the trivial names are taken from the plants they frequent, as the *chermes graminis*, or grass-bug; the *chermes ulmi*, or elm-bug, &c. The *chermes ficus*, or fig-tree bug, one of the largest, is brown above, and greenish beneath. The antennæ, likewise brown, are large, hairy, and one-third longer than the thorax. The feet are yellowish; the wings large, twice the length of the abdomen. They are placed so as to form together an acute roof. Their membrane is thin and very transparent; but with brown veins strongly marked, especially towards the extremity. The rostrum of this chermes is black, and rises from the lower part of the thorax, between the first and second pair of feet. It is found upon the fig-tree. The larva has six feet; and is like the insect, when provided with wings; its form is oblong, and its motion slow.—The chrysalids differ by two flat buds that spring from the thorax and inclose the wings, afterwards seen in the perfect insect. These chrysalids are frequently met with on plants; and the two plates of their thorax give them a broad uncouth appearance, and a heavy look.—When going to be metamorphosed, they remain motionless under some leaves. Their skin then divides upon the head and thorax, and the perfect insect comes forth with his wings, leaving the spoil of his chrysalis open, and rent anteriorly upon the leaf. These sloughs are often found beneath the leaves of the fig-tree. The perfect insect is furnished with four wings, large in proportion to its body, veined, and placed in the form of a roof. It has the faculty of leaping briskly by its hinder

legs, which play like a spring. When attempted to be taken, the chermes escapes rather by leaping than flying. —Some have a notable manœuvre; several have at the extremity of their body a small sharp-pointed implement, but concealed, which they draw out to deposit their eggs, by making a puncture in the plant that suits them. By this method, the fir-tree chermes produces that enormous scaly protuberance found at the summit of the branches of that tree, and formed by the extravasation of the juices occasioned by the punctures.

The young larvæ shelter themselves in cells in the tumour. The white down, under which the larva of the pine-chermes is found, seems to be produced much in the same manner. That of the box-tree chermes produces no tubercula like those; but its punctures make the leaves bend and grow hollow, like a cap, which, by the union of inflected leaves, produces at the extremity of the branches a kind of knobs, in which the larvæ of that insect find shelter. The box-chermes, as well as some others, has yet another peculiarity, that the larva and its chrysalis eject at the anus a white sweet-tasted matter, that softens under the touch, and is not unlike manna. This substance is found in small white grains within the balls formed by the box-leaves, and a string of the same matter is often seen depending from the anus of the insect.

Patella, a little husk or shell, found on the bark of the cherry, plum, rose, and other trees, containing an animal within, and useful in colouring. These patellæ are globular, except when they adhere to the tree, and mostly of a shining chesnut colour; the husk strikes a very fine crimson on paper, and within is a white maggot of no value; this, in time, hatches into a very small but beautiful bee; in size about half that of an ant, with a sting like bees, and three spots in a triangle on the forehead, supposed to be eyes. They are black, with a large round pale yellow spot on the back; the upper wings are shaded and spotted, but the under are clear. It is not yet determined whether the shells or husks yield a colour that might be useful. The deepest coloured husks afford the finest and deepest purple, when used while the animal is in the maggot form; for

after the change into the bee state, the shell is dry and colourless.*

VINE-FRETTER, OR PLANT-LOUSE,
(*Aphis*, *Puceron*.)

THE rostrum, or beak, is inflexed; the antennæ are longer than the thorax; the wings are four, and erect, or wanting; the feet of the ambulatory kind, and the belly often ends in two horns, whence is ejected that delicate juice called honey-dew.

The plum-tree has two very distinct sorts, one of a yellowish green, with a round short body; the other oblong, of a blueish green, enamelled with white. On the gooseberry-bush and currant the same aphides may be found; but each is inhabited by two very different species; one of a dusky green, with a short plump body; the other of a paler green, the body more taper, and transversely wrinkled. The rose-tree supports three distinct species; the largest is of a deep green, having long brownish legs, the joints of a very dark brown, also the horns and antennæ; a second sort is of a paler green, has much shorter legs, and a more flat body; the third sort is of a pale red, its body transversely wrinkled, and mostly found on the sweetbrier.

The extraordinary nature of these insects, has for some time justly excited wonder and attention. They were long ranked among the animals classed with the true androgynes, for not having been caught copulating, it was hastily surmised that they multiplied otherwise. This surmise was adopted by Reaumur, and supported by some peculiar observations; till Bonnet seemed to have cleared it up, by shutting up a young aphid at the instant of its birth, in the most perfect solitude, which yet brought forth in his sight ninety-five young ones.—The same experiment being made on one of these indi-

* Very possibly these patellæ may be the same sort of animals with the kermes; but then it produces its young within this shell or husk, which is no other than the skin of the mother animal's body; but being like many flies, whose worms are lodged in the bodies of other animals, this little bee may love to lay its egg in the body of the proper insect, and the maggot hatched from that egg, may eat up the proper progeny, and, undergoing its own natural changes there, issue out at length in form of the bee.

viduals, the new hermit soon multiplied like its parent; and one of this third generation, in like manner, brought up in solitude, proved equally fruitful. Repeated experiments, in this respect, to the fifth or sixth generation, uniformly presenting the observer with fecund virgins, were communicated to the Royal Academy of Sciences; when an unforeseen and very strange suspicion, imparted by Trembley to Bonnet, engaged him anew in a series of yet more painful experiments. In a letter from the Hague, in 1741, Trembley says, "I formed, since November, the design of rearing several generations of solitary pucerons, to see if they would all equally bring forth young. In cases so remote from usual circumstances, it is allowed to try all means; and I argued with myself, Who knows, but that one copulation might serve for several generations." This, who knows, to be sure, was next to avouching nothing; but coming from Trembley, it was sufficient to persuade Bonnet that his investigation had not gone far enough. If the fecundity of aphides was owing to the secret copulation suggested by Trembley, this copulation served at least five or more successive generations. Bonnet therefore reared to the amount of the tenth generation of solitary aphides, and had the patience to keep an account of the days and hours of the births of each generation. In short, it was discovered, that they are really distinguished by sexes; that there are males and females amongst them, whose amours are wholly unequivocal; that the males are but few, produced only in the tenth generation, and that these soon arrive at their full growth, and copulate with the females: the virtue of which serves for ten generations: all of which, except the first, (from the fecundated eggs,) are produced viviparous; and all the individuals are females, except those of the last generations, among whom, as already observed, some males appear to lay the foundations of a fresh series. These circumstances have been confirmed by other naturalists.

These insects are found in great numbers, not only on the stems and leaves, but even upon roots of many trees and plants. Those trees most loaded with them suffer greatly. The plant-lice thrust their sharp-pointed rostrum into the substance of the leaf, draw out their

sustenance, which warps the stems and leaves, and occasions cavities underneath, and swellings above; nay, in some, a kind of hollow gall is even filled with insects, as is often seen on elm-leaves. It appears astonishing that the slight puncture of so small an animal should so greatly disfigure a plant; but plant-lice always live in numerous associations, which increase visibly by the prodigious fruitfulness of those insects; so that although each puncture be slight, yet the number of them is so great, so reiterated, that it is no longer a wonder the leaves should be disfigured.—Lovers of gardening and plants are extremely anxious to free and cleanse their trees from this vermin; but their care often proves unavailing, the insect soon producing a fresh colony. The best and surest method of extirpation is to put on the trees infested with them some larvæ of the plant-louse lion, or aphidivorous flies. For those voracious larvæ destroy every day a great number of the insects, and that with so much the more facility, as the latter remain quiet and motionless in the neighbourhood of these dangerous enemies, who range over heaps of plant-lice, which they gradually devour.

OAK-PUCERON.

THESE insects bury themselves in the clefts of the oak, and some other trees, and getting into the crevices where the bark is a little separated from the wood, there live at ease and feed to their fill, without being exposed to their common enemies. They are larger than the other pucerons, the winged ones being nearly as large as a common house-fly, black; and those without wings are also larger than any other species of the same genus; and a coffee colour. Their trunk is twice the length of their bodies, and, when walking, is carried along the belly, trailing behind with the point up. When the creature has a mind to suck the part of the tree before it, it draws up, and shortens the trunk to a proper length and direction; but when it sucks in the common way, it crawls upon the inner surface of the bark, and fixes the turned up end of the trunk, which resembles a tail, against the wood behind, or contiguous to its back, and sucks there. The extremity of this trunk holds so fast by the wood, that when it is pulled away, it frequently brings a small piece of the wood with it.

Ants are as fond of these as of the other species of pucerons, and for the same reason, not feeding upon them, but on their ejections, a liquid sweetish matter, the natural juice of the tree very little altered. These creatures are the surest guides where to find this species of puceron; for if we at any time see a number of ants crawling upon an oak to a certain part, and there creeping into the clefts of the bark, we may be assured of finding there quantities of these oak pucerons. The ants are so extremely fond of the juices of the tree, when prepared for them by passing through the body of this animal, that when the puceron has a drop not yet evacuated, but hanging only in part out at the passage, an ant will often seize on it there.

EARTH-PUCERONS.

IN March, if the turf be raised in several places in any dry pasture, there will be found, under some parts, clusters of ants, gathered about some peculiar pucerons. These are large, of a greyish colour, and usually found in the midst of the clusters of ants. The common abode of the several other species of pucerons is on the young branches or leaves of trees; their only food being the juice of vegetables, probably these earth kinds draw out those juices from the roots of the grasses, and other plants, same as the others do from the branches. The ants that conduct us to these, also guide to most of the others; because, as these creatures feed on the saccharine juices of plants, they are evacuated in a liquid form, little altered; and the ants, who love such food, find it ready prepared in the excrements these little animals are continually voiding. — Some have supposed that these were the common pucerons which had crept into the earth, to preserve themselves from the rigour of winter. But this is not the case, as they are usually met with in places distant from the trees or plants, on which they might before have fed; and it is certain, that though many are killed by the cold, yet numbers escape, and are found early in spring, sucking the buds of the peach-tree; doubtless these creatures are in a feeding condition when under ground, else the ants would have no temptation to follow them; and certainly the several species, like the caterpillar kinds, have their peculiar herbs on which they feed; as many die of hunger rather than feed on any others; and it is not likely that these earth pucerons had been used to feed on leaves of trees and plants, and had left that food for the roots of grass.

LECTURE LXXI.

THE BUTTERFLY, (*Papilio.*)

It has four wings, imbricated with downy scales, the tongue convoluted in a spiral, the body hairy, the antennæ thicker towards the extremity, and in most subjects terminated by a capitulum or head. The wings, when sitting, are erect, and their extremities meet or touch above the body. They fly in the day-time. The species are principally distinguished by the colour of their wings.

The **EQUITES**, or **Riders**, have the upper wings longer from the hinder angle to the point than to the base, antennæ often filiform. They are divided into **Trojans**, mostly black, with blood-like spots on the breast; and **Greeks**, whose breast is without such marks, a small eye at the angle of the anus, some without bands or fillets, others with.

The **HELICONIANS**, whose wings are narrow throughout, often bare; the upper oblong, the under ones very short.

The **DANAI**, whose wings are entire, the *candidi*, with whitish wings; the *festivi*, with variegated wings.

The **NYMPHALS**, whose wings are denticulated; divided into the *gemmati*, whose wings have eyes; some have eyes on all the wings; others have them on the upper wings; others have them on the under ones; and the *phalerati*, whose wings are without eyes.

The **PLEBEIANS**, whose larva is often contracted; divided into the *rurales*, with darkish spots on their wings; and the *urbicolæ*, with spots generally transparent, on their wings.

The beauties of this elegant part of the creation are well known, and few can contemplate them without astonishment. The caterpillar informs us how it prepares for the lethargic sleep, the transition to its metamorphosis. That period being accomplished, it changes its form to become an inhabitant of the air. The *chrysalis**

* *Chrysalis*, or *aurelia*, a state of rest and seeming insensibility, which butterflies, moths, and several other kinds of insects, pass

being at once the tomb of the caterpillar and the cradle of the butterfly.

through before they arrive at their winged or perfect state. In this state, no creatures afford so beautiful a variety as the butterfly kinds, which all pass through this middle state. The figure of the aurelia, or chrysalis, is generally conical, and the creature seems without legs and wings, and devoid of any power of walking, and with scarcely so much as life. It takes no nourishment, nor has it any organs for the purpose; indeed, only its posterior part seems animated, having a power of some motions. The external covering is cartilaginous, considerably large, and usually smooth and glossy; but some have a few hairs; some are as hairy as the caterpillars whence they are produced; and others are rough or shagreened all over. In all may be distinguished two sides, one the back, the other the belly. On the anterior part of the latter, certain little elevations run in ridges, and resemble the fillets wound about mummies; the part whence these have their origin is esteemed the head of the animal. The other side, or back, is smooth, and in most of a rounded figure; but some have ridges on the anterior part and sides, which usually terminate in a point, and make an angular appearance.

This difference is the first general distinction into two classes, the round and the angular. The first are, by the French naturalists, called *feves*; from the common custom of so calling the chrysalis of the silkworm, which is round. This distinction is something more regular than might at first be conceived; most rounded chrysalises being produced by the phalenæ, or moths; and the angular ones by the papilios, or day-flies. There are subordinate distinctions; but they are less different from each other than the caterpillars, whence they are produced. The head of the first class usually terminates by two separate angular parts, which resemble a pair of horns. On the back are eminences and marks, which imagination may form into eyes, nose, chin, and other parts of the human face.

There is great variety and beauty in the figures and arrangement of these eminences and spots; those chrysalises terminated by a single horn, afford day-butterflies of that kind which have buttoned antennæ, whose wings, in a state of rest, cover the under part of their body, and which use all their six legs in walking; many other kinds using only four of them. Those chrysalises terminated by two angular bodies, covered with many spines, and having on their back the figure of a human face, in the greatest perfection, afford butterflies of the day kind; of that class, whose characters are, their walking on four legs, and using the other two, the anterior, in the manner of arms or hands. The chrysalises which have two angular bodies on their heads, but shorter than those of the preceding, and whose back faintly shows the human face, and which have fewer spines, and those less sharp, always turn to that sort of butterfly whose upper wings are divided into segments, one so long as to represent a tail, and whose



Camberwell Beauty.



Within a silken cell, or under a transparent veil, is this great miracle of nature daily wrought. But, how does the weak defenceless butterfly, scarce unfolded into existence, make its way through the impenetrable walls that preserved it from insult while torpid? How will it bear the effulgence of the light, and keenness of the air? Into one of the cells make an aperture, with scis-

under wings fold over the upper part of the back. Careful observation will establish many more rules, not so perfect as to be free from exceptions, yet of great use, and teach what sort of fly we may expect from the chrysalis, when ignorant of the caterpillar, and can only judge from appearances.

Most round chrysalises have their hinder part resembling a cone; but the upper end, which should be its circular plane base, usually bent and rounded into a knee, and called the head of the chrysalis; but some also have the head terminated by a nearly plane surface; some creeping ten-legged caterpillars give such chrysalises, each having two eminences approximating them to the angular kind.

Among the angular chrysalises are some whose colours seem as worthy of observation as the shapes of others. Many appear superbly clothed in gold; and have the name of chrysalis and aurelia, from Greek and Latin words signifying gold; and from them, all others similar have been called by the same names, however intitled to them; others are less ornamented with this gay appearance, having only a few spots in different places on the back and belly. These obvious marks, however, cannot be depended upon as distinctive, for accidents may alter them; and those which naturally would have been gilded over, are sometimes only partially so; and others are so formed, as not to shew any thing of the kind, but only a dusky brown. But those which have neither silver nor gold to recommend them, have other colours, beautifully variegated. Some are of an elegant green, as the chrysalis of the fennel caterpillar; others of an elegant yellow; and of a bright green, varied with spots of a shining black; as in the chrysalis of the elegant cabbage-caterpillar. The general colour of the chrysalis of common butterflies, is brown. Some are of a fine deep black; and so smooth and glossy, as to equal the finest Indian Japan, as the common caterpillar of the fig-tree, and that of the vine. The rounded chrysalises do not afford that variety of colouring so remarkably beautiful in the angular; being usually of a dusky yellow, in different shades, and often spotted with black; but all chrysalises, before they arrive at their fixed colour, pass through several temporary ones; differing in colour when first produced from the caterpillar, from what they are a few days afterwards; and some varying so as not to be distinguishable, even by the most experienced eye. The green rough cabbage caterpillar has a chrysalis, green at first, graduating through all the shades to its lasting colour, a faint yellow. One of the oak

sars, fix it under a magnifier; observe the insect, the organs gradually display themselves; follow his operations, he struggles to break loose from his confinement; observe the frothy liquor disgorged that serves to soften the end of the cell, which ultimately yields to the butting of the insect's head. By degrees the bar is removed, and the butterfly springs forth; the impression of the air acts upon its wings, slightly apparent at first, but which afterwards expand with remarkable rapidity.—Their display is sometimes checked by drought, and the insect is deprived of the faculty of flying. The rostrum, extended under the covering of the chrysalis,

caterpillars yields a chrysalis beautifully spotted with red at first, but changing to brown for its fixed colour: the third day usually fixes the lasting colours; and if they turn black in this time, they are either dead or dying.

A fly, spider, and ant, do not differ more from each other in appearance, than do a caterpillar, its chrysalis, and the butterfly produced from it; yet these are the product of the same individual egg; and the creature a-while a caterpillar, is afterwards a chrysalis, and then a butterfly. These changes produced so suddenly, seem like the metamorphoses recorded in the fables of the ancients; and possibly those fables first originated from such changes.

The parts being distinguishable in the chrysalis, they easily intimate the different species of fly to proceed from it. To the naked eye it evinces whether it be one that has, or is without, a trunk; and a microscope shows the antennæ so distinctly, that we may discern whether it is of the day or night class; and often its genus, if not species; nay, in the plumose horned kinds, the antennæ shew whether a male or female phalenæ will be produced from the chrysalis; the horns of the female being narrower, and less elevated above the common surface of the body. All these parts of the chrysalis, though distinctly obvious, are laid so close as to form apparently one mass; each is covered with its peculiar membrane, and all are surrounded by a common one, through which only they are seen; or rather on them are the figures of the parts moulded. The chrysalis is soft at first, and wet on the front with a viscous liquor; its skin gradually dries and hardens, but this viscous liquor round the wings, legs, &c. hardens immediately; and fastens all those limbs which were before loose; as it hardens, it loses its transparency, and becomes brown; so that only while it is moist can these parts be seen distinct,

Hence the chrysalis is strictly a butterfly, whose parts are hidden under certain membranes, which fasten them together till the limbs arrive at due strength to break through these membranes, and then they expand and arrange themselves in their proper order.

Purple Emperor





is now rolled up into a spiral in a recess. The fly is now perfect, it gently flutters, takes its flight, and pursues its mazy wanderings over the enamelled meads, plunging its rostrum into the cups of nectareous flowers.

The ground-colour of the *Papilio* is a beautiful glossy black; the superior wings have white forked clouds; the inferior, spots of a blood-colour, near extremities lunular, and indented, terminating in an extended tail, and edged with white; tips the same red colour; the *apex*, or crown of the head, encircles the shoulders, and terminates the abdomen.*

In another class of this species, the form of the wings resembles the preceding; they are beautifully variegated with black and yellow; the inferior terminate in a tail, and are adorned with a yellowish red eye, encircled with blue, at the edge, nearest the extremity of the abdomen. This is the largest, and one of the most beautiful native insects. The caterpillar is large and smooth, of a bright green colour, upon every ring are transversal bands, of a deep glossy purple, enriched with yellow spots.

The peacock, or peacock's eye, is easily known by the four peacock's eyes, one upon each wing. Its wings, very angulous, above are a reddish dun-colour, and black underneath. The upper have on their superior edge two black oblong spots, with a yellow one between. At their extremity is the eye, large, reddish in the middle, surrounded with a yellow circle, accompanied by a small portion of blue towards the exterior side; on which side, following the margin, are five or six white spots. The inferior wings are browner, and a large dark blue eye in the middle, surrounded by an ash-colour circle. The caterpillar is of a deep black, dotted with a little white.

One remarkable species is called the Bundle of Dry Leaves; this, when in a state of rest, wholly appears like a little cluster of decayed leaves. The position and colour of its wings greatly favour this resemblance, they have large ribs, like those of leaves, and are in-

* As minute descriptions of various species of butterflies are tedious and uninteresting, we refer the reader to the annexed engravings, in which the different species are represented in their three different states of grub, chrysalis, and fly; an inspection of which will teach more than several pages of verbal description.

dented similarly at their edges. This points out the care of Providence for the animal, and frequently may preserve it from birds, &c.

The **SKULL BUTTERFLY**, so called from its head resembling a death's head, or human skull. This very remarkable appearance is terrible to many people; but it has a greater singularity, when frightened,—it makes a mournful and harsh noise. This appeared surprising to Reaumur, as no other known butterfly had any voice. This philosopher not ready of belief that it was a real voice, suspected it, like that of the cicadæ, to be caused by the attrition of some part of the body; and he, by great pains, discovered that this noise was not truly vocal, but made by a hard and brisk rubbing of the trunk against two other hard bodies between which it is placed.

Another butterfly is so small that it might be mistaken for a small fly. These are black, green, lilac-coloured. The colours of these two last are the finest and loveliest in nature. This is certainly the extreme size of all known butterflies, and must be proportionably small as a caterpillar and chrysalis; this creature spends all the three stages of its whole life, caterpillar, chrysalis, and butterfly, on the leaf of the celandine. It lives on the under side, and though, as a caterpillar, it feeds on it, yet it does no damage; it does not eat the substance, but draws only a fine juice, which is soon repaired again, without occasioning any change in the appearance of the leaf. This species is very short-lived; and passes through its three states so soon, that frequently ten generations succeed in a-year; whereas, in all other butterflies, only two generations in the year are to be had. These two generations are sufficient to make a prodigious increase; in a large garden, twenty caterpillars, in spring, may be overlooked, and it may be concluded none are there, even on a narrow search; but if these twenty caterpillars become twenty butterflies, ten male and ten female, and each female lay four hundred eggs, like the common silk-worm, and were all the caterpillars hatched of these eggs to become butterflies, and lay eggs in the same proportion, to remain through the winter, and be hatched in the succeeding spring, then from these twenty, in only one year, will

Pink Underwing



Chickweed



be eight hundred thousand; and if to this be added the increase in a succeeding year, the number is terrible, and such as no art could guard against. The great Ruler of the world has put so many hinderances to this overabundant production, that very rarely such years of destruction happen; such have happened, however; and much mischief has been dreaded, not only from their eating all herbage, but from themselves being eaten with herbs in sallads and otherwise; but experiments have proved that they are innocent, and may be eaten as snails or oysters.

THE MOTH, (*Phalæna*.)

THE feelers are cetaceous, and taper gradually towards the points; the wings are often bent backwards.

1. The ATTACI, whose wings incline downwards and are spread open: they have pectinated antennæ without a tongue, or pectinated antennæ with a spiral tongue, or cetaceous antennæ with a spiral tongue.

2. The BOMBYCES, the wings cover the body nearly horizontally, pectinated antennæ; they either want the tongue, or have it so short as not to be manifestly spiral; the wings are either reversed or deflected; the spirilingues have a spiral tongue; and are either læves with smooth backs, or christatæ dorso, with a kind of crest or tuft of hair on the back.

3. The NOCTUÆ, have wings incumbent, as in the bombyces, but differ in the formation of the cetaceous antennæ. The noctuæ are either elingues, wanting tongues, or spirilingues, having spiral tongues.

4. The GEOMETRÆ, whose wings, when at rest, are extended horizontally: the antennæ in some pectinated, in others cetaceous; the under wings either angulated, or round, with entire edges.

5. The TORTRICES; the wings are exceeding obtuse, their exterior margin curved, declines towards the sides of the body. They have short palpi.

6. The PYRALIDES; the inner margins of the wings are laid one over the other; the wings themselves decline towards the sides, and, in shape, resemble a delta; they have considerable palpi of different forms.

7. The TINEÆ. The wings are wrapped up or.

folded round the body, so as to give the insect a cylindrical form; the forehead is advanced forwards.

8 The ALUCITÆ. The wings of this division are split, or divided into branches, almost to their base.

The caterpillars of this class vary considerably in size, shape, and the number of feet, most being found with ten, twelve, fourteen, and sixteen feet, the last are the most common and largest; those of ten and twelve feet are geometræ; amongst which some are very singular for their colour, the tubercula they bear, and the difference of their attitudes. Many resemble small branches or bits of dry wood; which probably saves many from the voraciousness of birds, who do not so easily discern them. Some caterpillars are very hairy, while several are quite smooth; the latter have a cleaner look, whereas the hairy ones have something hideous, and may even be hurtful when touched.

All these caterpillars, after several times casting their slough, spin the cell, in which they are transformed to chrysalids, much varied in texture, the fineness of the thread, and the different matters joined to the threads. The chrysalids are generally oblong ovals, not angulous as those of butterflies, nor so soon transformed to perfect insects. They remain much longer within their cell, most not coming forth till the ensuing year. Some remained in that state two or three years. Heat or cold contributes to forward or retard their final metamorphosis; which fact may be easily ascertained, as by procuring them a certain degree of moderate heat, one may see phalænæ brought forth upon the mantle-piece in the depth of winter.

The phalænæ, or perfect insects from these cells, are more clumsy and heavy than butterflies; their colours are more brown, dim, and obscure, though of some the colours are very lively and brilliant. Several fly only in the evening, keeping quiet and close under leaves in the day-time; hence by some authors called night butterflies. In summer evenings they find their way into rooms, attracted by the lights round which they hover. A sure method of catching a great number of phalænæ, is to hunt them by night in a bower with a lantern; they will resort to the light and may be caught. Of these

Swallow Tail



phalænæ, it is remarkable some of the females are without wings. By their looks they would not be taken for phalænæ; as they appear a large, short, six-legged, creeping animal; yet this heavy creature is a real phalænæ, easily distinguished by its antennæ. Its real wings are so short that they are mere small protuberances at the extremity of the thorax, and appear quite useless. The phalæna, whose females are without wings, have the antennæ pectinated; the unwinged females have antennæ similar to the males, but with shorter beards; their body is also charged with scales, the characteristic of insects of this order.

The *Phalæna attacus pavonia minor*, of a yellowish-grey colour. The wings are brown, undulated, and variegated, having some grey in the middle, and a margin one line broad. The under part has more grey, but the extremities of the wings have a broad brown band. The four wings have each a large eye, black encompassed with a dun-coloured circle, and above that a semicircle of white, then one of red, and the eye terminated by a whole circle of black. Across the middle is a small transverse whitish line. The caterpillar is green, has sixteen feet, with rose-colour tubercula, charged with long hairs, terminated by a small knob; dun-colour or reddish rings; and it is found upon fruit-trees.

Phalæna alucita pentadactyla. The eyes are black, the body a pale yellow, the wings snow white, and stretched asunder when the insect is at rest. The superior appear like two stumps of bird's feathers united at the base. The inferior are divided into three threads or bristles, furnished on both sides with fine fringes.—The caterpillar is of a green colour, dotted with black, and charged with a few hairs. It feeds upon grass, changes to a chrysalis in or about September, and appears a moth in August, frequenting woods.

Phalæna noctua elinguis humuli. The wings of the male are of a snowy white; of the female yellowish, with streaks; the shoulders, abdomen, &c. in both sexes, deep yellow; the antennæ are pectinated, and shorter than the thorax. The caterpillar feeds upon the roots of burdock, hops, &c. changes into a chry-

salis in May, appears in the winged state in June, frequenting low, marshy, and hop-grounds.

Phalæna noctua pronuba spirilinguis. The thorax, head, antennæ, feet, and upper wings, are of a brown colour, sometimes nearly black, but often of a blueish cast. The upper wings are clouded, and have one black spot on the middle, the other towards the outward angle of the lower part of the wing. The under ones are of a beautiful orange-colour, with a broad black band near the lower edge. The caterpillar is smooth; found particularly upon the thlaspi and several other cruciferous plants. It keeps concealed during the day, and feeds only by night. It is metamorphosed under ground, and some varieties of colour are observable, the females being green, the males brown.

Phalæna tortrix prasinana. The superior wings are of a fine green colour, with two diagonal yellow bars on each; the body and inferior wings are whitish, shaded with yellowish green. The caterpillar is a pale yellowish green, ornamented with small brown specks, the tail forked, and tipped with orange red, feeds on the oak, changes to a chrysalis in September, and assumes the fly-state about May, frequenting woods.

DRAGON-FLY, (*Libellula*.)

THE mouth is furnished with jaws: the feelers are shorter than the breast; and the tail of the male terminates in a kind of hooked forceps. The species are chiefly distinguished by their colour. Two very large and reticulated eyes cover the whole surface of the head. They fly very swiftly, and prey upon the wing, clearing the air of innumerable little flies. They are found in August and September, in our fields and gardens, especially near waters, as they originate from worms living in that element. The great ones usually live all their time about waters; but the smaller are common among hedges, and the smallest frequent gardens, and often settle upon bushes, or upon the ground; but the large ones are mostly upon the wing, so that it is very difficult to take them. Their eyes are beautiful objects for the microscope. The large species is from a water-worm, with six feet, which, yet young and very small, is transformed into a chrysalis, that dwells in the water,

and has been supposed to have gills like fishes. It wears a mask, as perfect as one worn at a masquerade; which, fastened to its neck, and moved at will, serves to hold its prey while devouring it. The period of transformation being come, the larva makes to the water-side, undertakes a voyage in search of a convenient place; fixes on a plant, or sticks fast to a bit of dry wood. In this position it becomes the chrysalis, whose cell, when parched, splits at the upper part of the thorax. The winged insect issues forth gradually, throws off its slough, expands its wings, flutters, and then flies off with gracefulness and ease. Its elegant slender shape, richness of colours, delicacy and resplendent texture of wings, afford infinite delight. The sexual parts are differently situated: in the male, under the body at the joining of the thorax; in the females are a slit placed at the extremity of the body. Their amours commence in a rape: the male, while hovering about, watches, and then, with the pincers at the extremity of his tail, seizes the female by the head, and travels through the air, till the female, yielding to superior strength, or rather to inclination, forms her body into a circle, that terminates at the genitals of the male, to accomplish the purpose of nature. These rapes are common; libellulæ are seen thus coupled in the air, exhibiting the form of a ring. The female deposits her eggs in the water, whence spring water-worms, which afterwards undergo the same transformations.

THE DAY-FLY, (*Ephemera*.)

It has no teeth or palpi; there are two large protuberances above the eyes; the wings are erect, the two hind ones being largest; and the tail is bristly. These flies take their name from their shortness of life; some live several days, others do not take flight till sun-set, and live not to see his rising. Some exist but one hour, others half that time; but in this short period they comply with the calls of nature. To those that live several days, there is a peculiarity incident: they cast off one slough more, which operation sometimes takes twenty-four hours to complete; for this purpose they cling fast to a tree. The ephemeræ, before they flutter in air, have in some manner been fishes. They remain in

the states of larva and chrysalis for one, two, or three years. The chrysalis differs from the larva only by there being observable on its back cases for wings. Both have, on their sides, small fringes of hair, which, when in motion, serve them as fins; and extremely curious is the plying of those little oars in the water. Their abdomen is terminated, as well as in their state of flies, by three threads. The larva scoop out dwellings in the banks of rivers; small tubes, like siphons, one arm serving for an entrance, the other affording an outlet. The banks of some rivers are often thus perforated. When the waters decrease, they dig fresh holes lower, to enjoy their element, the water. The season and hour when the chrysalids of the different species of the ephemeræ turn into flies, maintain a kind of regularity. The heat, the rise or fall of the waters, accelerate, however, or postpone their final display. The ephemera of the Rhine appear in the air two hours before sun-set; and are hatched nearly at the same instant, in such numbers as to darken the air. The most early of those on the Marne and Seine, in France, do not begin to fly till two hours after sun-set, towards the middle of August. They are seen fluttering and sporting on the brink of their tomb. The glare of light attracts them, round which they perform a thousand circles with amazing regularity. Their coming together for the purpose of generation can only be surmised, their shortness of life requiring all its functions to be proportionable to its duration. Some naturalists are of opinion, that the males impregnate the eggs, similarly to fishes. The females, by the help of the threads of their tail and the flapping of their wings, support themselves on the surface of the water, and in that almost upright situation drop their eggs in clusters. One female will lay from 700 to 800 eggs, which sink to the bottom. The larvæ that escape the voraciousness of fishes, construct habitations to shelter them from every kind of danger. When the flies have propagated, they die and fall by heaps; and the land and water are strewn with them to a considerable thickness. The fishermen consider these multitudes of destroyed insects as manna for the fishes.

WASP, OR SAVAGE, (*Sphex Inchneumon.*)

THE mouth is armed with entire jaws, but contains no tongue; the mandibles are horny, crooked, dentated; the lip horny, the apex membranaceous; the palpi or feelers are four; only two species are natives of Britain and Ireland, 1. The *viatica*, is black; the antennæ are short and thick; three first segments of the abdomen red-brown; pedicle short; length half-an-inch. 2. The *cribraria* is black, with yellow ringlets on the abdomen; the antennæ short, and turned backwards; the fore-legs broad, with an appendix like a shield. The manner of living differs in the various species, and so does the general form of the body, and their haunts; but though the method of life be utterly different, yet in all the same manners appear innate and inherent. They are the fiercest of all flies: they will attack insects much larger than themselves, and this whether they be defenceless or armed, as they are provided with a sting. Their strength is great; their jaws are hard and sharp, and in their sting lies a poison suddenly fatal to the creatures they engage. The savage seizes hardily on the animal he attacks, and gives a stroke of amazing force; after which he falls down as if himself were killed, but it is to rest from his fatigue, and enjoy his victory. He keeps a steady eye on the creature he has struck, till it dies, which happens in a few minutes, and then he drags it to the nest to feed the young. The number of other insects they destroy is scarce to be conceived; the mouth of their cave is like that of a giant in the days of yore, strewn with the remains of prey. The eyes, the filament that serves as a brain, and a small part of the contents of the body, are all the savage eats, and he will kill fifty for a meal.

Ray says, of the sphex—"On June 22, 1667, I saw it dragging along a caterpillar three times larger than itself, which, after carrying it upwards of fifteen feet, it deposited near the entrance of a hole previously dug in the earth. It then removed a little ball of earth that covered the entrance, and went in; soon it came out again, and seizing the caterpillar, drew it into the hole, and left it, then it shoved some globules of earth one after another into the hole, till it was filled, at times descending, probably to press down and consolidate the earth, and also flying to a neighbouring fir-tree, perhaps to procure turpentine to conglutinate the work,

When the hole was filled, and the surface levelled, so that the entrance could no longer be discerned, it took two leaves of fir, which were lying near, and placed them close to the entrance, as if to mark the spot. Who (says the pious observer,) can contemplate such things without admiration and astonishment; or attribute them to a mere machine!"

THE WASP, (*Vespa*.)

THE mouth consists of two jaws without any proboscis; the superior wings are plaited; the eyes are lunar; and there is a sharp sting in the tail. There are only three species natives of Britain, the *crabo*, the *vulgaris*, and the *coarctata*.

The Hornet, (*crabo*.) It has tawny antennæ; the segments of the abdomen are black on the anterior part, and yellow on the posterior, with two black spots on each. Its length is an inch; it builds in hollow trees. Its cakes or combs are composed of a substance like coarse paper, or rusty parchment. It is very voracious, devouring other insects, and even bees.

The Common Wasp, (*vulgaris*.) The male has seven yellow segments of the abdomen, with a black triangle on each; the head is yellow, and the antennæ long. The upper lip of the female is yellow, the antennæ short; there are six segments of the abdomen, with two lateral black spots on each. There are three sorts, the queens or females, the males, and the common labouring wasps, or neuters, neither males nor females, consequently barren. The queens, of which there is a great number, are much longer in the body, and larger than any other wasp; they have a large heavy belly, corresponding in size to their prodigious quantity of eggs. The males are less than the queens, but longer and larger than the common wasps, which are the smallest; only they are without stings, which both the queens and common wasps possess. In one nest are two or three hundred males, and as many females; their number depending on its size; the males are bred, or at least, mostly reside in the two apartments between the combs, next to the uppermost cell. The antennæ of the males are longer and larger than those of the other sorts; but their chief distinction consists in their parts of generation, which are altogether peculiar. The neuters are the labourers, employed to procure materials

for, and construct the nests, and also to furnish the other wasps and the young with provisions.

At the beginning of winter, the wasps totally destroy all the eggs, and young ones ; the neuters and males employed in this work, being unfurnished with provisions, perish ; and none survive except some few females, fecundated in October, and which raise a new colony in the spring. When a new commonwealth is founded by each single female impregnated during the autumn, that has weathered out the severity of the winter. It digs a hole in a dry soil, contrives itself a sinuous inlet, or else it takes up with the dwelling-place of a mole, where it hastily builds a few cells and deposits its eggs. In twenty days, they have gone through the different states of larvæ, chrysalids, and turned to wasps. Nature, all-wise, provides for every thing. The neuters only labour to found the republic. The first eggs hatched prove neuters. As soon as they come into existence, they fall to work, enlarge the hole, and go about upon wood, lattice-work, and window-sashes, searching materials for building. With their teeth they cut, hack, and tear off small fibres of wood, which they moisten with a liquor they disgorge, and then convey them to the work-shop, where other labourers are in waiting, who, with those materials, construct the wasp nest, commonly round, and of materials resembling fine paper. The common covering is several leaves or layers, with intermediate spaces pierced by two holes at a distance, one for the entrance, and the other only for their exit. The space within this covering is cut by a number of horizontal planes, with intervals about half-an-inch ; they are suspended by ligaments, and attached to the covering by their edges ; they all have hexagonal cells in their lower surface.

The eggs are oblong, resembling those of a common fly, but larger, and always fastened to the angles, never to the sides of a cell. They are usually placed single, very seldom two in one cell, and, if laid so, only one succeeds ; for never is more than one worm found in a cell. The heads of all the nymphs are turned toward the centre of the comb, and their tails go obliquely downward toward the base of the cell. They are continually opening their mouths, and moving their forceps, ever hungry, and impatiently waiting for food from their parents. The cells are left open till the nymph is at its full growth ; then the wasps cover it with a thin lid, under which the worm undergoes its transformation ; and when arrived at the wasp-state, it eats through this thin cover, and comes to work with the others. The elder brothers, or first hatched insects, take amazing care of those born after them, by proportioning their food to the delicacy of their stomach :—First, the juice of fruits and meats ; afterwards, the carcasses of insects. The caterers provide for the labourers ; each takes his own portion ; there is no dispute, no fighting. The republic daily multiplies, living in profound peace. Every individual, as soon as he has acquired sufficient strength, flies away to the fields. They then become a gang of banditti ; they pillage wall-trees, break into fruit before its maturity, dart with the fierceness of hawks upon bees,

cut their throats to possess themselves of their honey, plunder and lay waste their commonwealth, oblige them to emigrate, and riot on the fruits of their labour. During the period of plenty, the wasps bring all the booty to the nest, share it, and then goes forwards only feasting, rioting, and good fellowship; but concord is never lasting among robbers. Towards October provisions begin to run short, the neuters and males mercilessly tear from their cradles the eggs, the larvæ, the chrysalids, and the new-born insects; and they next fight against each other. Frosts and rains throw the citizens into a state of languor, and luckily for us and our bees, most all perish, except a few females, which in the ensuing spring found new republics.

The Small Wasp, (*coarctata*,) has black antennæ, yellowish at the base; the head is black, with a yellow spot between the antennæ, and another at the base of the upper lip. Each segment of the abdomen is bordered with yellow. It is about half-an-inch long. Its history and manners are the same as those of the common wasp; but their buildings are differently constructed. Their nest is fastened to the branch of a tree, and from the size of an orange to that of an egg. Wood reduced to paper is the material, which, if of a ruddy colour, might be taken for a large opening rose. It is covered with an impenetrable varnish by water. One of those nests was neither molified nor impaired by that element.

THE BAT, (*Vespertilio*.)

ALL the teeth are erect, pointed, near; and the first four equal. The fore-feet have the toes connected by a membrane expanded into a kind of wings, by which the creature is enabled to fly. The most remarkable are:—

The Vampire, or Ternate Bat, (*vampyrus*,) with large canine teeth, four cutting teeth above and below, sharp black nose, large naked ears, the tongue pointed, terminated by sharp aculeated papillæ; talons very crooked, strong, and compressive sidewise; no tail, the membrane divided behind quite to the rump; head of a dark ferruginous colour, the neck, shoulder, and under-side, much lighter and brighter red; on the back the hair shorter, dusky, and smooth; the membranes of the wings dusky. They vary in colour, some being entirely of a reddish brown, others dusky.

These monsters inhabit Guinea, Madagascar, and all the islands in the Indian Ocean. They fly in flocks, and obscure the light

The Bat



The Vampire



with their numbers ; they begin their flight from one neighbouring island to another, immediately on sunset, and return in clouds from day-break till sun-rise. They live on fruits, and are so fond of the juice of the palm-tree, that they will intoxicate themselves with it till they drop on the ground. Probably, from the size of their teeth, they are carnivorous ; they will dip into the sea for fish. They swarm like bees, hanging from the trees in great clusters. The Indians eat them, and declare the flesh to be very good ; they grow excessively fat at certain seasons. The French, in the Isle de Bourbon, boil them in their bouillon, to give it a relish. The negroes abhor them. Many are of an enormous size : Beckman measured one, whose extent from tip to tip of the wings was five feet four inches ; and Dampier another, which extended farther than he could reach with outstretched arms. Their bodies are from the size of a pullet to that of a dove, their cry is dreadful, smell rank, bite venomous, resistance and fierceness great when taken.

The ancients had some knowledge of these animals. Herodotus mentions certain winged wild beasts, (like bats,) that so molested the Arabs who collected the cassia, that they were obliged to cover their faces, except their eyes, with skins. Very probably from such relations, poets formed their fictions of Harpies.

Linnaeus conjectures this to be the kind which draws blood from people in their sleep. Buffon denies it, ascribing that faculty only to a species found in South America. But there is reason to imagine, that this thirst after blood is not confined to the bats of one continent, or one species ; for Bontius and Nicuoff declare that the bats of Java seldom fail to attack persons who lie with their feet uncovered, whenever they can get access ; and Gummilla, after mentioning a greater and less species found on the banks of the Orinoco, declares they are equally greedy after human blood. Persons thus attacked have been known to be near passing from a sound sleep into eternity. The bat is so dexterous a bleeder, as to insinuate its aculeated tongue into a vein without being perceived, and then suck the blood till it is satiated ; all the while fanning with its wings, and agitating the air in that hot climate in so pleasing a manner, as to lull the sufferer into a still sounder sleep. It is therefore very unsafe to rest either in the open air, or to leave open any entrance to these dangerous animals : but they do not confine themselves to human blood ; for Condamine says, that in certain parts of America they destroyed all the large cattle introduced by the missionaries.

The Spectre, (*spectrum*,) with a long nose, large teeth, long, broad, and upright ears ; at the end of the nose a long conic erect membrane, bent at the end, and flexible ; hair on the body cinereous, and long ; wings full of ramified fibres, the membrane extends from hind leg to hind leg ; no tail, but from the rump extend three tendons, terminating at the edge of the membrane. By Seba's figure, the extent of the wings are two feet

two inches ; from the end of the nose to the rump seven inches and an half. Inhabits South America, lives in the palm-trees, grows very fat, called *vampyre* by Buffon, who supposes it the species that sucks human blood ; but neither Piso, nor any other writer who mention the fact, gives the least description of the kind.

The Peruvian Bat, hath a head like a pug-dog, large straight pointed ears, two canine teeth, and two small cutting teeth between, in each jaw ; the tail is inclosed in the membrane which joins each hind leg, and is also supported by two long cartilaginous ligaments involved in the membrane ; colour of the fur, iron grey ; body equal to that of a middle-sized rat ; extent of the wings two feet five inches.

The Noctule hath the nose slightly bilobated, ears small and rounded, on the chin a minute verruca : hair reddish ash-colour ; length of the rump near three inches ; tail above one inch ; extent of wings thirteen inches. Inhabits Great Britain and France, flies high in search of food, not skimming near the ground. A gentleman informed Pennant of this fact, which he witnessed : he saw taken under the eaves of Queen's College, Cambridge, in one night, 185, the second night sixty-three, the third night two, and each that was measured had fifteen inches extent of wings.

The Common Bat, (*murinus*) has a tail, the lips and nose are simple, and the ears smaller than the head.— It inhabits Europe, and is found in Britain. This animal flies only during the night, living chiefly on moths ; when it lights on the ground it is unable to rise again till it has crawled up something ; it remains torpid during winter, revives in the beginning of spring, and comes abroad in the dusk of the evening. This species is two inches and a half long, when full grown, and about nine inches in winged extent ; the fur is of a mouse-colour, tinged with reddish ; it generally skims near the ground, with an uneven jerking flight ; and, often seeking for knats and other aquatic insects, flies close by the surface of water. It breeds in the summer season, and is preyed on by owls.

Bats are very voracious, if proper food is to be had ; and though moths and other insects be their natural and common food, yet if flesh, raw or roasted, fresh or corrupted, comes in their way, they

greedily devour it. In this country they appear abroad early in the spring, flying about only in the evenings; but are sometimes roused from their torpidity by a warm day or two during winter, and will then venture out in quest of food, but recommence their state of hybernation whenever the cold returns; they retire at the end of summer into caves, ruined houses, or the roofs and eaves of houses, where they remain suspended by the hind legs, and enveloped in their wings, generally in large numbers. Bats may be caught by the flower-cups of burdock, whitened and thrown up in the way of their flight; they are attracted by the whiteness, and the hooks of the bur sticking to their membranous wings, make them fall to the ground.

THE BEE, (*Apis*.)

To their delicious task the fervent bees,
In swarming millions tend; around, athwart,
Through the soft air, the busy nations fly,
Cling to the bud, and with inserted tube,
Suck its pure essence, its ethereal soul;
And oft, with bolder wing, they soaring dare
The purple heath, or where the wild thyme grows,
And yellow loads them with the luscious spoil.

THESE insects are distinguished into species, each having peculiar genius, talent, manners, and disposition. Variety prevails in their architecture, and the nature of their materials. Some live in society, and share the toils; such are the common bee and the drone. Others dwell and work in solitude, building the cradles of their families; as the leaf-cutter bee does with the rose-tree leaf; the upholsterer, with the gaudy tapestry of the corn-rose; the mason-bee with a plaster; and the wood-piercer with saw-dust. All are employed in their little hermitage, with the care of providing for the wants of their posterity. The mouth is furnished with two jaws, and a proboscis in a double sheath; the wings are four, the two foremost covering those behind when at rest; in the anus or tail of the females and working-bees there is a hidden sting.

The following species are most remarkable. 1. The BLACK BEE, (*florisomis*,) with a cylindrical incurvated belly, having two toothed-like protuberances at the anus, and a kind of prickles on the hind-legs. This bee sleeps in flowers.

2. The SHINING GREEN BEE, (*dentata*,) with black wings, and a kind of teeth on the hind-thighs.—The tongue of this bee is almost as long as its body.

3. The *VARIEGATA*; the breast and belly are variegated with white and black spots; the legs are of an iron colour. It is a native of Europe. This species sleeps in the *geranium phæum*, or spotted crane's-bill.

4. The *MOSTRATA* has the upper lip inflected and conical, and the belly invested with blueish belts. They build in high sandy grounds, and there is but one young in each nest.

5. The *SMOOTH BLACK BEE*, (*ferruginea*), with the feelers, mouth, belly, and feet of an iron colour.—This is small, and supposed to be intermediate between the bee and wasp. It is a native of Europe.

6. The *YELLOWISH HAIRY BEE*, (*cariosa*), the feet and front are of a bright yellow colour. It builds in the rotten trees of Europe.

7. The *PALE-RED HAIRY BEE*, (*brasilianorum*), with the basis of the thighs black, is very large, covered with a testaceous skin. It is a native of America.

8. The *RED HAIRY BEE*, (*lapidaria*), with a yellow anus, builds in holes of rocks.

9. The *BLACK AND HAIRY BEE*, (*terrestris*), with a white belt round the breast, and a white anus: it builds its nest very deep in the earth.

10. The *RED BEE*, (*violacea*), is very hairy, with blueish wings. It is a native of Europe. The violacea perforates trees, and hollows them longitudinally; at the bottom of these holes they begin to build their cells, composed of gluten of the farina of plants and honey, and deposit an egg in each cell.

11. The *YELLOW HAIRY BEE*, (*muscosum*), with a white belly, builds in mossy grounds, and the skill displayed is admirable; to enjoy the pleasure of seeing their operations, take a nest to pieces, and convey the moss to a distance. The bees will form themselves into a chain, from their nest to the place where the moss has been laid. The foremost lays hold of some with the teeth, clears it bit by bit with the feet, (whence their name also of carding-bees,) then by the feet she drives the unravelled moss under her belly to the second, who pushes it on to the third; and thus is formed an uninterrupted chain of moss, which is wrought and interwoven with the greatest dexterity by those at the nest; and that their nest may not be the sport of winds,

and that it may be sheltered from rain, they throw an arch over it, composed of a tenacious, yet thin wax, which, dissolved in oil of turpentine, may be used in taking off impressions.

12. The LEAF-CUTTER, or Black Bee, (*centuncularis*,) having its belly covered with yellow down.—The nests are made of leaves curiously plaited like a matt or quilt. The several varieties of the leaf-cutting bees are all equally industrious. They dig into the ground, and build their nests; some have the form and size of thimbles, inserted one within another, others of goose-quills; composed of pieces of leaves; each sort cuts its own materials; some the rose-tree leaf, others the horse-chesnut. A careful observer may discover rose-tree leaves cut as with a pinking-iron; and there he may have the pleasure of seeing, with what dexterity a bee, destitute of any mathematical instrument, cuts out a circular piece, fit to be either the bottom or the lid of a nest; others it cuts out into ovals and semi-ovals, for the sides; into each nest it deposits one egg with ready-prepared victuals.

The most important species is the common Honey Bee, which has always been celebrated as an example of industry, order, and foresight; though these qualities must be ascribed solely to an instinct, which impels these animals to pursue their occupations with certain success, from always adopting the same mode of accomplishing them.

A swarm of bees is composed of three kinds: a female or queen; and labourers, which are supposed to be of no sex. There is seldom more than one queen in a hive, and there are few males compared with the labourers. The queen is less in the trunk than the males, and altogether larger than the labourers. Her size and shape are much larger in summer than winter, and she possesses a sting similar to that of the Working Bee. The Labouring Bee is curiously adapted to the offices it has to perform: the tongue is extremely large in proportion to the size of the insect: in length it consists of three parts; one, its articulation with the head, which has some affinity to the larynx in the human body; the next, the body of the tongue, formed of a kind of base, which supports the true tongue: this base is of a horny substance, in which there is a groove, and it is united with the larynx. On the end of this is the true tongue, with its different parts. This apparatus is enclosed in two horny scales; each of which is likewise composed of two parts, or scales, one articulated with the other. Barbut says, the mechanism of this curious member consists of

twenty parts. The apparatus can be folded up under the head and neck, and the formation of the oesophagus terminates in a fine, transparent bag, which is the immediate receptacle of whatever is swallowed. When this bag is filled with honey the bees return to the hive, and disgorge into a cell the whole of the produce of their labours. Sometimes on its way to the hive, the bee is accosted by a hungry companion, when they mutually stop; and the one whose stomach is full of honey extends its trunk, opens its mouth, and forces up the honey, or while the hungry bee ruminates, sucks the honey from the other's mouth. When not impeded on the road, the bee proceeds to the hive, and in the same manner offers its honey to those who are at work, as if it meant to prevent the necessity of their quitting their labour in order to go in quest of food. In bad weather, the bees feed on the honey laid up in open cells; but such is their forethought, that they never touch their reservoirs, while their companions are enabled to supply them with fresh honey from the fields. Occasionally, the queen, attended by a numerous retinue, marches from cell to cell, plunging the extremity of her body into each of them, and leaving in each an egg, from which, after a day or two, the grub is excluded from the shell, lying on a bed of a whitish jelly, on which it begins to feed. The common bees now attend with astonishing tenderness and anxiety, and unremittingly watch over it. The grub attains its full growth in about six days, when its attendants shut up the mouth of its apartment with wax, and thus enclosed, it soon begins to line the walls of its cell with a silken tapestry, in which it undergoes its last transformation.

When it first crawls forth a winged insect, it is very weak and inactive; but, in the course of a few hours, it acquires strength enough to fly off to its labour. On its emerging from the cell, the officious bees flock round it, and lick up its moisture with their tongues. One party bring honey for it to feed upon; and another is employed in cleansing the cell, and carrying out the filth, for the purpose of preparing it for a new inhabitant.

Having accomplished all their tasks previously to the approach of winter, a scene ensues that marks their economy, but seems to partake of cruelty. They will not suffer a useless mouth to partake of their hoarded store; and the males, or drones, being no longer necessary, are worried by the labourers; who pinch and pull about the defenceless insects, till they are fairly worn out, and die exhausted by the ill-treatment of their fellow-citizens.—Bees possess the five senses, and have the power of uttering a voice. Previously to swarming they utter a peculiar sound like that of a small trumpet. A hive frequently sends off a colony about the beginning of June, when the young swarm prepares to quit the parental dwelling by hanging about the mouth of the entrance for some days, and it is supposed that a young queen is their leader. Their mode of working is very curious. They lay the foundations of their combs with surprising quickness and alacrity, and the combs are generally arranged in a direction parallel to each other. An interval or street between them is always left, that the bees may have an easy access with the different combs in the hive.

—The males, after the female is fecundated, become useless, and even offensive to the rest of the hive. The working bees, who had formerly been their nurses, at once break loose upon them with unrelenting fury, and in a few days destroy the whole with dreadful carnage. These, however, are not the only combats in which bees are engaged; the working bees of the same hive often challenge and provoke each other to battle; the one endeavouring to find a place in the scaly body of his adversary, into which he may thrust his sting, and the other as studiously warding off the blow. Sometimes three or four attack a single bee, without any design upon his life, but with a view to force him to disgorge his honey. Battles are also occasioned, when a neighbouring swarm, from poverty, or a principle of injustice, invade a hive already occupied. Scarcely have they entered the walls of the city, when a general engagement ensues; those who have the right of possession oppose their invaders with all their force and undaunted courage; and not a minute passes without a victorious bee dragging to the door of the hive a dead adversary, or one struggling in the agonies of death. These engagements only close with the day, and often cost thousands their lives.

Insects of their own species are far from being the only enemy which the bees have to fear: worms, wasps, hornets, and insects of different kinds are constantly attempting to gain ingress by any rent or crevice which is left open, and when attacked by these marauders, the bees perish in the unequal combat, and the victors rip up their bodies to extract the honey they contain.

The structure and economy of the bee have already been the subjects of much disquisition and research. It has been generally supposed that the queen bee is the only female in the hive, and that the working bees are neutral; but, according to M. Schirach, all the working or common bees are females in disguise; and the queen bee lays only two kinds of eggs, viz. those which are to produce the drones, and those from which the working bees are to proceed: and from any one or more of these, one or more queens may be produced; so that every worm of the latter or common kind, which has been hatched three days, is capable, under certain circumstances, of becoming the queen or mother of a hive. This doctrine has been confirmed by M. Debray, of Cambridge. Even with the assistance of glass hives, it is difficult to perceive the manner in which bees operate when constructing their cells. They are so eager to afford mutual assistance, that many of them crowd together, and their individual operations can seldom be distinctly observed. Their two jaws, however, are the only instruments they employ in modelling and polishing the wax. With a little patience and attention, we perceive cells just begun: we likewise remark the quickness with which a bee moves its teeth against a small portion of the cell. This portion the animal, by repeated strokes on each side, smooths, renders compact, and reduces to a proper thinness; and while some individuals of the hive are lengthening their hexagonal tubes, others are laying the foundations of new ones.

Sir Thomas Cullum, in a letter to Mr. Marsham, states that, the

key not easily turning round in the lock of one of his garden-gates. he looked into the key-hole, and, observing in it something white, ordered the lock to be taken off. When this was done, the lock was found completely full of a downy substance, which contained the chrysalids of the garden bee. The down, as Sir Thomas imagined, was that of the *anemone sylvestris*, of which there were two plants in his garden. He preserved the whole as he found it, but none of the bees contained in it had then made their appearance in a perfect state. This nidus was afterwards sent to the Rev. Mr. Kirby, and five of the chrysalids produced perfect insects; namely, three males, and two females. On comparing the down of which it was composed with that of the campion, Mr. K. was of opinion, that Sir Thomas Cullum had mistaken its composition, as the down of the anemone is of a more silky texture than that used in this nest. There were, in the lock, several cells or cases, unconnected with each other except by the wool, which was their common covering. These cells were of an oval form, and had an exterior coat of wool: under this there was a membranaceous cell, covered with several small vermiform masses, of a brown substance, apparently formed of pollen and honey. These were laid, without any regular order, over the cell; and, by means of them, the wool, which formed its exterior coat, was made to adhere. At the summit of this membranaceous case there was a small orifice, and within it another cell, somewhat strong and coriaceous, of a brown colour, and shining in the inside as much as if it had been covered with tinfoil. This was supposed to be the cocoon of the larva, previously to its assuming the pupa state.

Mr. Wildman, whose remarks on the management of bees are well known, possessed a secret by which he could at any time cause a hive of bees to swarm upon his head, shoulders, or body, in a most surprising manner. He has been seen to drink a glass of wine, having at the same time the bees all over his head and face more than an inch deep: several fell into the glass, but they did not sting him. He could even act the part of a general with them, by marshalling them in battle-array upon a large table.—There he divided them into regiments, battalions, and companies, according to military discipline, waiting only for his word of command. The moment he uttered the word, march! they began to march in a regular manner, like soldiers. To these insects he also taught so much politeness, that they never attempted to sting any of the numerous company which, at different times, resorted to admire this singular spectacle.

In this country it is usual, in seizing the stores of these little animals, to rob them also of their lives, by suffocating them with the fumes of roll-brimstone. Such cruelty and ingratitude presents a strong contrast with the industry and economy of the animal itself. The spirit of improvement in the social arts of life during late years has, however, been directed to this subject: in truth, it may be considered as one of the proudest labours in which the ingenuity of man can be exercised, and we feel happy in recording the success of the experiment.

According to the official returns, England pays annually to

Germany, from 40,000*l.* to 50,000*l.* for wax and honey imported thence, and which might very easily be raised at home, by a more extended and judicious cultivation of bees. Greater attention to this useful appendage to the cottage, would not only produce commercial advantage, but improve the condition of the peasantry. It is not generally known, indeed, what profitable returns may be obtained, at a trifling expense of time and labour, by very simple processes. Even supposing the first cost of a swarm one guinea, (the price in the places where they are dearest,) the cottager is almost certain, by proper care and management, of clearing, in five years, a net produce of nearly 60*l.*; and of having also, at the end of that period, ten good stocks of bees.

The apiary should afford the bees the best shelter and protection against moisture, the extremes of heat and of cold, and sudden vicissitudes of temperature, and against their numerous enemies; afford them every facility of constructing their combs, and rearing their young; allow every part of the combs to be occasionally inspected, and be capable of removal when requisite; and, while due attention is paid to economy, the hives should be made of durable materials.

The hive recommended by Mr. Huish, as affording sufficient facility for examining any of the combs, and performing on them any operation at pleasure, is very similar in form to that used in Greece. The body is a straw basket, shaped like a flower-pot, or of a broader diameter above than below. Eight pieces of well-seasoned wood, about eight inches broad, and half-an-inch thick, are laid parallel, at equal distances, over the top of the basket, and fastened to an outer projecting band: they are then covered with net-work, with a circular board, or better, a convex cover of straw, extending over the whole of the top. The net-work obliges the bees to fasten their combs to the transverse boards, by which each comb can easily be lifted up, without interfering with any other part of the hive, or occasioning the loss of a single bee; and the whole of the interior of the hive is thus open to inspection, and we can trace the devastations of the moth, or ascertain the presence of any other enemy.*

* SHORT DIRECTIONS TO COTTAGERS ON BEES.

BEES give profit without expense: and are, therefore, a desirable object to cottagers.—Honey is in many cases an helpful medicine; and wax is always a profitable article of sale.—A hive of bees is as good as a guinea a-year.—A straw hive costs fifteen-pence, and, if properly used, will last twenty years. The best situation for a bee-house is that where it can be oftenest seen: but where there is choice, it should, perhaps, face the North.—Every thing belonging to bees should always be kept perfectly clean and neat; and nothing suffered to be near them that will harbour mice or vermin.—Bees should at all seasons be well guarded from wind and rain; and in winter entirely from sun.

In May and June bees should be examined very frequently between nine and four. When a swarm rises, do not interrupt it with any noise or officious meddling, but wait quietly till it has settled.—A swarm of bees (unless after notice to keep off,) may be legally followed as far as seen; but satisfaction must be made for any damage done.—Procure hives of different sizes, but all of the same width at bottom.—While the swarm is settling, rub the board, and hive that is to receive them, perfectly clean with a dry

The whole history of these animals would extend far beyond our limits; we have, therefore, contented ourselves with giving its most important stages. Its industry has, in all ages, been proverbial, and its economy, besides furnishing inexhaustible subject for whole volumes, has been pleasingly illustrated in some of the sweetest specimens of ancient and modern poetry. No subject is perhaps so well calculated to induce us to persevere in the pleasing task of making ourselves acquainted with the great works in the creation, as the history of these interesting insects.—Pope, in his *Essay on Man*, thus characterizes them :

Learn each small people's genius, policies,
The ants' republic, and the realm of bees ;
How those in common all their wealth bestow,
And anarchy without confusion know :
And these for ever, though a monarch reign,
Their separate cells and properties maintain.
Mark what unvaried laws preserve each state,
Laws wise as Nature, and as fix'd as Fate.

coarse cloth ; having first selected one of a suitable size, according to the following rules :—

If the swarm is early and large—the largest hive.—If a swarm is **VERY** early and small—a large hive.—If the swarm is late, and **VERY** large—a large hive.—If the swarm is late and small—a small hive.—Ringing bees is of no use ; and dressing hives displeases, and gives them trouble.—Put no stick in any hive.—When bees are hived, place a wedge or small stone under one side of the hive, so as to raise it a little, for the more free admission of bees not shaken in.—Shade the new-hived swarm from the sun with green boughs or a cloth ; and at sun-set place it properly on a board, and on the bench.

If you wish to obtain the honey without destroying the bees, it may be done thus simply : on the night after a swarm, place the old hive upside down (having first loosened it on the board and stopped the entrance) on a large kettle of boiling water, but so as not to touch the water ; then take off the board, and instantly clap on an empty hive, mouth to mouth, wrapping a cloth close around where they meet. In ten minutes they will begin to ascend, and will all settle in a bunch in the upper hive, which may be replaced on the board and on the bench. This, however, should not be done later than June, nor till after a **SECOND** swarm, **IF THE FIRST IS VERY EARLY**.

If a great quantity of young bees in the maggot state are observed in the combs, such combs should be left, and the bees returned to their old hive. Should any accident happen, the bees may be all beaten and shaken out on the grass, (taking care not to tread on them) and a hive set with a stone under one side, into which they will all collect, or in a bunch near it, and all may be set to right before sun-rise.

When the buckwheat blossom is over, bees should be secured from wasps and vermin, by a grate of **ONE, TWO, OR THREE** holes, according to the strength of the hive.

When the bee-house faces the South, or is much exposed to the sun, the hives should in winter be shaded ; or, if the cottager has such convenience, should be taken into a cold dark cellar, and there kept undisturbed until the snowdrops are old in blossom.

The accompanying engraving exhibits the structure and economy of the bee. *Fig. 1.* is the queen-bee. 2. The drone. 3. The working-bee. 4. Represents the bees hanging to each other by the feet, taking their repose. 5. The proboscis or trunk magnified, with which they gather the honey and take their nourishment. 6. One of the hind legs of a working-bee loaded with wax. 7. A comb, in which the working-bees are bred: the cells are the smallest of any: a royal cell is suspended on one side. 8. A comb in which the drones are bred, being larger than the former; the young drones being included in several of them; with two royal cells suspended on the side. 9. A similar comb, in which the royal cell is fixed in the middle, and several common cells are sacrificed to serve as a basis and support to it; in general, the royal cells are suspended on the side of a comb, as in *fig. 7, 8.* At the side of *fig. 9.* two royal cells are begun; they resemble pretty much the cup in which an acorn lies: the other royal cells have the young queens included in them. *Fig. 10.* exhibits the sting and all its parts, magnified: the sting is composed of a sheath or case, and two shanks, united to each other, and terminating in a sharp point, so as to look like a single part; *b*, the poisonous bag; *c*, the tube that conveys the poison to the sting; *dd*, the two shanks of the sting; *ee*, the sheath of the sting; *ff*, the thickest end of the sheath, where the tube opens into it with the poison; *g*, the point of the sting; *h* the beards or jags with which the sting is armed; *i*, the tube that secretes the poison; *kk*, extremity of the tube; *llll*, cartilages which are articulated with the shanks of the sting; *mm*, two other cartilages, less than the former; *nnnn*, places where the foregoing cartilages are articulated; *oooo*, four muscles serving to move the sting different ways; *pp*, two muscles which draw the shanks of the sting into its sheath; *qq*, two appendages of the sting, which are moved along with it, and seem to answer no other purpose than that of ornament.—*Fig. 11.* The ovary. 12. Six eggs drawn after nature, and placed on their ends. 13. An egg viewed with a microscope: it resembles the skin of a fish, divested of its scales, but still retaining the marks of their insertion. 14. Worms of bees of different sizes, drawn after nature; *a*, a worm newly hatched; *b c d e*, four worms that received more nourishment, and are more grown; *f g*, two worms still larger than the former, having had more nourishment provided for them: they are represented as they lie doubled in their cells; *h*, a worm placed on its belly, so as to show on its back a black line, which denotes the stomach; *i*, a worm lying on its back, beginning to draw in the hinder part of its body, and move its head. *Fig. 15.* A full grown worm viewed with a microscope; *aa*, its fourteen annular incisions or divisions; *b*, the head and eyes, &c.; *ccc*, ten breathing holes. 16. The worm forming its web; *aa*, the sides of the cell that contain it; *b*, bottom of the cell; *c*, entrance or door of the cell: the worm is here represented as making its web to shut up this entrance. *Fig. 17.* A worm taken out of the web, and just ready to cast its skin. 18. A cell containing the worm changed into a nymph, and perfectly lined with the worm's web: likewise the web entire, with the

nymph contained in it, as they appear on opening the cell; *aa*, the sides of the cell, lined with the worm's web; *b*, the mouth of the cell, closed by the web; *c*, the bottom of the cell; *d*, the web entire, as it appears on opening the cell, which it greatly resembles in form; *e*, the upper part of the web, of a convex form: this part shews its filaments pretty distinctly; *f*, the inclosed nymph appearing through the transparent sides of the web; *g*, the bottom of the web answering to that of the wax cell. *Fig. 19.* Is a worm changed to a nymph, of its natural size and form, yet so as to exhibit its limbs, which are folded up in a curious manner. 20. The nymph of the bee viewed with the microscope, displaying all the parts of the inclosed insect, and the beautiful manner in which they are laid up; *a*, the head bloated with humours; *bb*, the eyes, projecting considerably; *cc*, the horns, or antennæ; *d*, the lip; *ee*, the teeth, or jaw-bones; *ff*, the first pair of joints belonging to the proboscis; *h*, the proboscis itself; *ii*, the first pair of legs; *kk*, two transparent little parts, lying against the lowest joints of the first pair of legs; *ll*, the second pair of legs; *mm*, the wings; *nn*, the blade-bones; *oo*, the last pair of legs; *pp*, the abdominal rings; *q*, the hinder part of the body; *r*, two little parts accompanying the sting; *s*, the anus. *Fig. 21. a*, A cell full of bee-bread, placed in layers; *b*, little grains, of which the said substance, viewed with a microscope, appears to consist.

THE FLY, (*Musca.*)

THE mouth is furnished with a fleshy proboscis, and two lateral lips; but no palpi. This genus is divided into two different sections: Those with simple antennæ, and those furnished with a lateral hair or feather. They have downy bodies, though scarce perceptibly so; and have either a lateral plume or feather on the antennæ, or a simple hair on the side of the antennæ. The pilosæ have a few hairs scattered upon their bodies, principally upon the thorax, and they have either a lateral feather or a lateral hair. Variety runs through their forms, structure, organization, metamorphoses, manner of living, propagating their species, and providing for posterity. Every species is furnished with implements adapted to its exigencies. What exquisiteness! what proportion in the several parts that compose the body of a fly! What precision, what mechanism in the springs and motion! Some are oviparous, others viviparous; which latter have but two young ones at a time, whereas the propagation of the former is by hundreds. Flies are lascivious troublesome insects, that put up with every kind of food. When storms impend, they have most activity, and sting with greatest

force. They multiply most in hot moist climates; and so numerous formerly were they in Spain, that fly-hunters were commissioned to destroy them. The vapour of sulphur or arsenic destroys them; and their numbers may be reduced by taking them in phials of honeyed-water, or between boards done over with honey.

MAGGOT,

THE common name of the fly-worm bred in flesh, from the egg of the great blue flesh-fly. Notwithstanding the distaste for this animal, its figure and structure of parts are worth attention, and a description of them may serve as a general history of the class of worms produced from the eggs of flies.

This animal is white and fleshy; its body is composed of a number of rings, like caterpillars and similar insects; and is capable of assuming different figures; being at times more or less extended, and consequently more or less thick. Although it has no legs, it is able to move very swiftly; and, in its first attempt to move, its body is extended to its greatest length, and assumes something of the figure of a pointed cone. The pointed part is the head, and is not separated by any deeper furrow than the other rings are from each other. In some states two short horns appear thrust from the head; but more often two scaly hooks are observable; sometimes, however, hid in a sheath, into which the animal can retract them. These hooks are bent into an arch, whose concavity is towards the plane on which the creature is placed; they are thickest at their insertion, and thence diminish gradually till they terminate in a fine sharp point. Being placed in a parallel direction, they can never come together, and therefore cannot serve like teeth to grind the food; but merely pull and sever it into a proper size for the mouth. Besides these hooks, the maggot has a kind of dart, about a-third of their length, and placed between them; also brown and scaly, quite straight, and terminating in a fine point. The hooks have two scaly thorns at their points; and this dart seems intended, by reiterated strokes, to divide and break into smaller parts the pieces of flesh these have separated. Immediately below the apertures for the egress of the hooks, is the mouth which the creature does not show, unless pressed; but when the pressure is properly managed, it will open sufficiently to discover within a small protuberance, very naturally supposed to be either the tongue or the sucker. The hooks supply not only the place of teeth, but also of legs; since it pulls itself along by fastening these hooks into the substance it is placed on, and then drawing up its body to it.

The back gradually lowers as it approaches the extremity of the belly; and near that place are the creature's two principal organs of respiration. There are two small roundish brown spots, very easily distinguishable by the naked eye, the rest of the body being

white; but assisted by glasses, each spot appears a brown circular eminence, a little above the rest of the body. On each spot are also discoverable three oblong oval cavities, situated parallel to each other, and their length in nearly a direction perpendicular to that of the animal's body. These apertures are stigmata, or air-holes, to admit the air necessary to the life of the animal.

The great transparency of the animal's body affords opportunity also to distinguish on each side a large white vessel, running the whole length of the body, whose course is easy to follow, but they are most distinct towards its hinder part; and are always seen to terminate each in the brown spot above mentioned; consequently, it is probable that they are the two principal tracheæ. Their ramifications are very beautifully seen, especially on its belly; and no vessel analogous to the great artery in the caterpillar class, can be discovered in these; though, if there were any such, their great transparence must needs make them very easily distinguishable; nor could its dilatations and contractions, if so considerable as in that class of animals, be less so. Malpighi imagined, that this artery in the caterpillar class was a series of hearts; in its place, however; there may be seen in these animals a true heart, about the fourth ring of their body; a small fleshy part, which has alternate contractions and dilatations; and is not only discoverable in the body by its transparence, but, on making a proper section in the second, third, and fourth, will be thrown out of the body, and continue its beats for some time afterwards.

OESTRUS.

It has no mouth; but three punctures, without trunk or beak; antennæ taper, proceeding from a lenticular joint. There are five species.

1. The BREEZE, OR GAD-FLY, (*Bovis*.) Thorax yellow, with a black transverse line between the wings; abdomen, tawney with fine black transverse lines, last segment black; wings white with a brown transverse line, and three brown spots. Size of the large blue fly. Deposits its eggs under the skin on the backs of oxen, where the maggots are nourished till June; and plague the cattle so all the summer, that they fly for refuge into the water, and scarcely quit it the whole day.

2. The HÆMORRHOIDALIS. Body long, black, covered with tawny hair; middle of the thorax less hairy; wings immaculate; antennæ very short; length half-an-inch. Deposits its eggs in the rectum of horses, and occasions great torment.

3. The GREY FLY, (*Ovis*.) Spotted with black; front pale-yellow; legs brownish; wings with short black veins; length half-an-inch. Breeds in the frontal

sinus of sheep; where the maggots, hatched from the eggs, lodge the whole winter, vellicating the internal membranes, and often bringing on death.*

* *Sheep Nose-Worms*, a species of fly-worm found in the noses of sheep, goats, and stags, produced there from the egg of the ovis, two-winged fly. In the frontal sinews above the nose, in sheep and other animals, sufficiently large, and always full of a soft white matter, furnishing a proper nourishment, these worms live, and attain their full growth; and when they have acquired the condition fit to undergo their changes for the fly-state, they leave this habitation, and, falling to the earth, bury themselves; when these are hatched into flies, the female, after being impregnated by the male, is aware that the nose of a sheep, or other animal, is the only proper place to deposit her eggs, that they may vivify.—It is common to find one worm, often two, but very seldom any more than three. Vallisnieri first gave a true account of their origin; though the creatures themselves were very early discovered, and ages since esteemed useful medicines in epilepsies. The worm has two parallel brown strong hooks at the anterior part; it is composed of eleven rings, forming a cone, something flattened, and the head is the point. When young, it is very white; but has two brown spots in the hinder part, which are its two posterior stigmata. Each spot is parted by a whitish concentric circle, which plainly gives passage to the air; as it can shew them, and also draw them within its posterior ring. The anus is just below, usually hid by the folds of the skin; just above the hooks are two little fleshy horns, between which is the mouth.—The worm, when full grown, is large and brownish, or of a dirty white; its belly, examined by the microscope, is furnished with many fine short prickles between the rings; whose points, turned backward, may be felt in drawing the finger along the belly from the hinder part toward the head.

These worms are capable of moving very swiftly, and their motions, and the pain given to the sensible membranes, from being wounded by the hooks and prickles, cause sheep often to grow outrageous, and strike their heads against trees and other hard bodies. When these worms are taken out, if they fall on the earth, they immediately bury themselves in it; and if not at their full growth, or in a proper state for their changes, they die; but if near the time when they would naturally have quitted their habitation, indicated by their change from fine white to brownish, then they undergo their changes within a shell made by their hardened skin, of the same shape with the animal, but a deep brown colour.

The time for the creature to undergo its several changes, is according to the season. Mr. Vallisnieri had one produced in the perfect fly-state, in forty days from its first change. Reaumur found those which formed their shell on the 24th of April, not to produce the fly before the 27th of June. When ready to appear in the fly state, it has no great difficulty in getting out of its case; the practice of swelling and inflating its head, and throwing out

4. The *NASALIS*. Body black; but the head, thorax, and abdomen, covered with pale red hair, except the first segment of the latter, which is covered with white hair; the wings immaculate. Breeds in the fauces of horses, entering by their nose.

5. The *TARANDI*. Thorax yellow; with a black line between the wings, which are immaculate; abdomen tawny, last segment black. Infests the back of the rein-deer, so as greatly to retard the breed. The rein-deer every year fly to the Alpine mountains, to escape their pursuit; yet numbers of them perish thereby at two years old; the others are emaciated, and their skins spoiled.—It is a most curious insect, distinguished into several species, by the different places wherein they de-

its bladder, usual on this occasion, easily detaches a piece of the shell, originally loose, and gives the fly a sufficient passage

This fly is, during its life, very lazy, and unwillingly uses either its legs or wings. Its head and corcelet are as long as its body, composed of five rings, streaked on the back; pale yellow and brown spots are disposed irregularly; but on the belly the brown makes three lines, one in the middle, and one on each side, the intermediate spaces being yellow. The wings are nearly of the same length with, and are a little inclined so as to lie upon the body; which they do not cover, but a naked space is left. The petty wings found under are whitish, and perfectly cover the balancers, only seen by lifting up these. The upper part of the corcelet is full of small black prominences, which, examined by the microscope, appear as so many corns of gunpowder. The head is large in proportion to the body; its reticular eyes of a deep changeable green, take up less space than those of most other flies; a considerable space is between them, in which are three smaller or glossy eyes, placed in a small triangle, and so near as to touch. The upper part of the head is yellowish, and, viewed by the microscope, appears cavernous, like a sponge, or morel; and in the bottom of each cavity is a little black prominence. In other two hollows in the anterior part are the antennæ placed, of the battledore form, rather round than flat, with a large hair going from each. The under part of the head rounder than the upper, is whitish, and very smooth; two sorts of bands, directed downward, are elongations of the rims of arches where the antennæ lodge. The smoothness of the under part of the head shews very distinctly these three little tubercles; the upper one brown, the under ones pale yellow. The mouth seems placed between the two immediately under the upper tubercle. The fly will live ten months after it is produced from the shell, but takes no nourishment of any kind; and possibly it may be of the same nature with the butterflies, which never take any food during the whole course of their living in that state.

posit their eggs. Some, instructed by nature that their eggs can be hatched only under skins of living creatures, as bulls, cows, rein-deer, stags, and camels, fix upon them at the instant of laying their eggs. From their hinder part issues a whimble of wonderful structure: a scaly cylinder, of four sliding tubes, like the pieces of a spying-glass; the last has three hooks, and is the gimblet to bore through the tough hides of cattle. The animal seems not to experience pain from the puncture, except where the insect, plunging too deep, attacks some nervous fibre; then the beast runs about and becomes furious. The eggs being hatched, the grub feeds on the matter of the wound, and forms upon the body a bunch of humour, sometimes an inch high. When full grown, the larva breaks through the tumor, and slides down to the ground, doing this in the cool of the morning, that it may neither be overpowered by the heat of the day, nor chilled by the cold of the night. It then digs a burrow, into which it retires. Its skin grows hard, and turns to a very solid shell. There it is transformed to a chrysalis, and afterwards to a winged insect. Nature has provided for every exigence; the shell wherein it is inclosed is so strong that it could not make its way out, was there not at the end a small valve, closed by a very slight filament. The first push the oestrus makes the door gives way, and the prison opens. The insect wings its way to woods and places frequented by cattle.

THE BREEZE-FLY, (*Tabanus*.)

THE mouth is extended in a fleshy proboscis, terminated by two lips; the rostrum has two pointed palpi on each side of the proboscis, and parallel.

1. The GREAT HORSE FLY, (*bovinus*,) has a grey head; most of it occupied by eyes of a blackish brown. The thorax grey: the abdomen yellowish, with a triangular white spot on the middle of every ring, which constitutes a longitudinal band of spots, the point of which is directed towards the thorax; the thighs are blackish, and the legs yellow; the wings are dusky, with brown veins. This insect is the terror of horned cattle, horses, &c. Its mouth is armed with two sharp hooks, which penetrate their hide; while with its pro-

boscis, which is shaped like a sting, it sucks their blood, of which it is very greedy; and the puncture is keen and painful. The insect is very common in damp woods and meadows, and especially during great heats, it is most troublesome. Horned cattle are sometimes so molested, that they go mad, run down precipices, tear themselves on the stumps of trees, stones, &c.

2. The *PLUVIATILIS* is of an ashen grey, its eyes green, with brown streaks. The thorax is brown, marked with longitudinal grey lines; the wings, brown and ash-coloured, are dotted over with small white spots, and a black spot on the margin; the legs are surrounded with brown and white rings alternately. This species is very common in meadows, about four lines long.

3. The *CÆCUTIENS* has a brown head; eyes green and brown, with black spots; the thorax brown with black spots; the abdomen above yellow, with triangular brown spots; yellow legs, and white wings with black and brown spots. The length is four lines and a half.

THE GNAT, (*Culex*.)

THE mouth is formed by a flexible sheath, inclosing bristles pointed like stings. The antennæ of the males are filiform; those of the females feathered. There are seven species. These insects, too well known by the severe punctures they inflict, and the itchings thence arising, afford a most interesting history. Before they turn to flying insects, they have been aquatic animals, under two different forms. You may observe in stagnate waters, from the beginning of May till winter, small grubs with their heads downwards, their hinder parts on the surface of the water; from which part arises sideways a kind of vent-hole, or small hollow tube like a funnel, which is the organ of respiration. The head is armed with hooks, that serve to seize on insects, and bits of grass on which it feeds. On the sides are four small fins, by which the insect swims about, and dives to the bottom. These larvæ retain their form during a fortnight or three weeks, after which period they turn to chrysalids. All the parts of the winged insect are distinguishable through the robe that shrouds them. The chrysalids are rolled up into spirals. The

situation and shape of the wind-pipe is then altered ; it consists of two tubes near the head, which occupy the place of the stigmata, through which the winged insect is to breathe. These chrysalids, constantly on the surface of the water to draw breath, abstain now from eating ; but upon the least motion unroll and plunge to the bottom, by little paddles at their hinder part. After three or four days strict fasting, they pass to the state of gnats. A moment before, water was its element ; but now, become an aërial insect, he can no longer exist in it. He swells his head, and bursts his inclosure. The robe he lately wore turns to a ship, of which the insect is the mast and sail. If there arise a breeze at the instant the gnat displays his wings, it proves to him a dreadful hurricane ; the water gets into the ship, and the insect, not yet loosened from it, sinks and is lost. But in calm weather, the gnat forsakes his slough, dries himself, flies into the air, seeks to pump the alimentary juice of leaves, or the blood of men and beasts. The sting, which our naked eye discovers, is but a tube, containing five or six exquisitely minute spicula ; some dentated at their extremity like the head of an arrow, others sharp-edged like razors. These spicula, introduced into the veins, act as pump-suckers, into which the blood ascends by the small capillary tubes. The insect injects into the wound a small quantity of liquor, which renders the blood more fluid, and is seen, by the microscope, passing through those spicula. The animal swells, grows red, and does not quit his hold till gorged. The liquor injected, by its irritation, cause that disagreeable itching we experience, and which is removable by volatile alkali, or washing with vinegar the part newly stung, else the venom ferments, and you would only increase the tumour and the itching. Rubbing the part at night with fuller's-earth and water, lessens the pain and inflammation. Gnats perform copulation in the air. The female deposits her eggs on the water, by the help of her moveable hinder part and her legs, placing them one by the side of another in the form of a little boat, composed of two or three hundred eggs, swims on the water two or three days, after which they are hatched. If a storm arises, the boats are sunk. Every month brings a fresh progeny of these insects.—

Were they not devoured by birds, and several carnivorous insects, the air would be darkened by them.

Gnats in this country, however troublesome, are not so venomous in stinging as the musquito-flies (*culex pipiens*) in foreign parts. In the day-time, or at night, the mosquitoes come into the houses, and when the people are retired to bed, commence their disagreeable humming, approaching nearer the bed, and at last suck up so much blood that they can hardly fly away. The bite causes blisters in people of a delicate constitution. When the weather has been cool some days, the mosquitoes disappear; but when it changes, and especially after rain, they frequently gather in astonishing quantities about the houses. In sultry evenings they accompany the cattle in swarms, from the woods to the houses or towns; and when they are driven before the houses, the gnats fly in wherever they can. In the greatest heat of summer they are so numerous, that in some places the air seems to be quite full of them, especially near swamps and stagnate waters, such as the river Morris, in New Jersey. The inhabitants make a fire before their houses that the smoke may expel these disagreeable guests.

THE HORSE-FLY, (*Hippobosca*.)

THE beak consists of two valves, is cylindrical, obtuse, and hanging; and the feet have several claws. There are four species distinguished by their wings, &c. The most remarkable is the equina, the pest of horses and cows. This insect is broad, flat, shining, and scaly. — Its head, thorax, and abdomen, are yellow, undulated with brown; and the legs are intersected with yellow and brown. The wings, crossed one over the other, exceed the length of the body; they are transparent, tinged with a little yellow towards their outward edge, and near which is a spot of a brown colour. These insects are with difficulty killed, from the hard crustaceous shell which covers them; and with their claws they fix so close and fast to the poor animals, that they cannot rub or bite them off without wounding themselves.

THE FLEA, (*Pulex*.)

HAS two eyes and six feet, fitted for leaping; the feelers are like threads; the rostrum is inflected, setaceous, and armed with a sting; and the belly is compressed.

The generation of this familiar vermin affords something very curious. Fleas bring forth eggs, or nits, which they deposit on animals that afford them a proper food: these eggs being very round and smooth, usually slip straight down, unless detained by the pile, or other inequalities of the clothes, hairs, &c. Of these eggs are hatched white worms, of a shining pearl colour, which feed on the scurfy substance of the cuticle, the downy matter gathered in the pile of clothes, or other like substances. In a fortnight they are a tolerable size, very lively and active; and, if disturbed, suddenly roll themselves into a kind of ball. Soon after, they creep, like silk-worms, with a very swift motion. When arrived at their size, they hide themselves, and spin a silken thread with their mouth, forming a small round case, white within as paper, but without always dirty, and foul. Hence, after a fortnight's rest, bursts out a perfect flea; leaving its exuviae in the bag. While it remains in the bag, it is milk-white, till the second day before its eruption; when it becomes coloured, grows hard, and gets strength; so that upon its first delivery, it springs nimbly away.

By keeping fleas in a glass tube corked up, but so as to admit fresh air, their several actions may be observed, and particularly their coition tail to tail; the female, much the larger, standing on the male. They may also be seen to lay their eggs, ten or twelve in a day, for several days in succession; which eggs afterwards hatch in the same order. The flea may easily be dissected in a drop of water; and the stomach and bowels, with their peristaltic motion, may be discovered plainly, as also their testes and penis, with the veins and arteries, though minute beyond all conception. Lecuwenboek affirms also, that he has seen innumerable animalcules, shaped like serpents, in the semen of a flea. This blood-thirsty insect, which fattens at the expence of the human species, prefers the more delicate skin of women; but preys especially upon epileptic persons, though not upon the dead or dying. It loves to nestle in the fur of dogs, cats, and rats; and the nests of river-swallows are sometimes plentifully stored with them.

Fleas are apterous; walk but little, but leap to a height equal to 200 times that of their own body. This amazing motion is performed by the elasticity of their feet, whose articulations are so many springs. Thus it eludes, with surprising agility, the pursuit of the person on whom it riots.*

* Among the memorabilia of fleas, one has been seen to draw a small silver piece of ordnance, to which it was fastened, the firing

At Surat fleas, bugs, and other voracious vermin, are in such great veneration, that they have an hospital endowed, where every night a poor fellow, for hire, suffers himself to be preyed upon. He is fastened naked on a bed, when the feast begins at his expense. In Turkey there is a similar establishment for diseased dogs; an institution less ridiculous than the other. Mercurial ointment, brimstone, a fumigation with the leaves of pennyroyal, or fresh-gathered leaves of that plant sewed up in a bag, and laid in the bed, are remedies destructive of fleas.

JERMES PULSATORIUS,

THE second kind of *death-watch*. The abdomen is oblong, mouth red, eyes yellow, and antennæ setaceous. The former only beats seven or eight strokes, and quickly; the latter will beat hours together without intermission; and his strokes are more leisurely, and like the beat of a watch. This latter is a small greyish insect, much like a louse, viewed with the naked eye. It is very frequently found in old books and paper, old furniture, collections of insects, &c.; the pupa beats on thin wood, with either its head, or tail, at pleasure. It is very common in all parts of the house in summer; is very nimble in running to shelter, and shy of beating when disturbed; but will beat freely before you, and also answer the beating, if you can view it without disturbance, or shaking the place where it lies.

THE LOUSE, (*Pediculus*.)

HAS six feet, two eyes, and a sort of sting in the mouth; the feelers are as long as the thorax; and the belly is depressed and sublobated. It is oviparous, not peculiar to man, but infesting quadrupeds, birds, and even fishes and vegetables; of a peculiar species on each,

of the gun nowise daunting its intrepidity. The owner carried it about in a little box, lined with velvet, every now and then placing it on her arm, to let it feed; but winter put an end to the being of this martial flea. Another flea, that became a slave to an Englishman, had, for its daily and easy task, to drag its golden chain and padlock, of the weight of one grain; and it lived in a box with wool kept warm, near seven years. A third flea served as a thrill-horse to an English artist, who had made an ivory coach and six, that carried a coachman with his dog between his legs, a postilion, two footmen, and four inside riders.

according to its peculiar nature; some differing from those which infest the human body. Even insects are infested with vermin which feed on and torment them: several kinds of beetles are subject to lice; particularly that kind called the *lousy beetle*: the lice on which are very numerous, and will not be shaken off. The earwig, just at the setting on of its head, is often infested with lice; white, and shining like mites, but much smaller; round-backed, flat-bellied, and have long legs. Snails, especially the large naked sorts, are very subject to lice; continually running about, and devouring them. Numbers of little red lice, with a very small head, and resembling a tortoise, are often about the legs of spiders, and they never leave him while he lives; but when he is killed, they almost instantly forsake him. Whitish lice are found on humble-bees, also upon ants, and fishes.

Kircher found lice also on flies: La Hire gives a curious account of the creature he found on the common fly. Viewing a living fly with the microscope, he observed on its head, back, and shoulders, numbers of small animals crawling nimbly about, and often climbing up the hairs at the origin of the fly's legs. With a fine needle he took up one, and placed it before the microscope used to view the animalcules in fluids. It had eight legs; four on each side; not very distant, but the four towards the head separated by a small space from the four towards the tail. The feet had a particular structure, being composed of several fingers, as if fitted for holding any thing; and especially the two nearest the head. The extremities of the legs, a little way above the feet, were dry and void of flesh, like the legs of birds; but higher, they appeared plump and fleshy. Upon its head were two small horns, several hairs closely arranged, with some other clusters of hairs by their side, but not of the same figure; and towards the origin of the hinder legs two other such clusters, originating at the middle of the back. The whole creature was a bright yellowish red; the legs, and all the body, except a large spot in the centre, were perfectly transparent.

LECTURE LXXII.

ON VEGETATION.

Hail, Source of Being; Universal Soul
 Of heaven and earth! Essential Presence hail!
 To Thee I bend the knee! to Thee my thoughts,
 Continual, climb; who, with a master-hand,
 Hast the great whole into perfection touched.
 By Thee the various vegetative tribes,
 Wrapt in a filmy net, and clad with leaves,
 Draw the live ether, and imbibe the dew:
 By Thee disposed into congenial soils,
 Stands each attractive plant, and sucks, and swells
 The juicy tide, a twining mass of tubes:
 At thy command the vernal sun awakes
 The torpid sap, detruded to the root
 By wintry winds; that now in fluent dance,
 And lively fermentation, mounting, spreads
 All this innumerable-coloured scene of things.

THOMSON.

IN the first volume have been discussed at length the nature and laws of inorganic substances, or bodies which at most simply grow by accretion and crystallization; but we now arrive at a superior kind of existences, which present a regular organization, and which, besides growing, evince a principle of individuality, generally called life. Looking to final causes, or to the useful objects of this part of the creation, it would seem that the process of vegetation prepares, appropriates, and concentrates the elements for the use of the next succeeding order of existences, which, besides growing and living, are able to move from place to place, and for that purpose possess powers of perception and volition, neither of which being necessary to vegetables, do not appear to belong to them.

The species of vegetation which flourishes in every country, and in different altitudes of the same country, is determined by the temperature and moisture. These circumstances, therefore, determine the character and quality of the vegetation, which again determine the number and character of the animals which can find subsistence, while these in their turn afford food for certain carnivorous species. Heat, or atomic motion,

acting upon air and water in different soils, appears to be the great agent of vegetable growth. Animal support is consequent, and every part of nature proceeds in perfect accordance, fitness, and harmony with all other parts. Where appropriate vegetables will not thrive, there the animals which feed upon them do not exist, or speedily perish; and the number and variety of the latter, whether graminiverous or carnivorous, is necessarily in proportion to the luxuriance of the former. Hence the infinite variety and multitudes of insects, birds, quadrupeds, and bipeds, which are to be found within the tropics, and the small number which exist in the frigid zones, the number being determined by the quantity of food.

Boerhaave defines a plant to be an organical body, composed of vessels and juices; to which body belongs a root, or a part by which it adheres to some other body, and particularly the earth, from which it derives the matter of its life and growth. It is distinguished from a fossil by its being organized, and consisting of vessels and juices; and from an animal, by its adhering to another body, and deriving its nourishment from it.

The roots, stalk, branches, leaves, flowers, and fruit, comprise all that is most remarkable in their external parts. The roots, by means of their different kinds of hinges, tuberosities, and ramifications, keep the plant fixed to the earth; while their pores imbibe an exceedingly fine slime, which the water liquifies, and carries with it. From the root springs the stalk, to which the plant partly owes its strength and beauty. Being sometimes shaped like a pipe, the stalk is fortified by knots skilfully disposed. As it is sometimes too weak to support itself, it twists round a solid prop, fastening by means of the little hands with which it is furnished. In some it appears a strong pillar, rearing its proud head aloft in the air, and braving all the fury of storms and tempests.

The branches shoot forth like so many arms, from the trunk and stalk, on which they are distributed with great regularity. They are divided and subdivided into many small boughs; the subdivisions observing the same order as the principal divisions.

Leaves, those charming ornaments of plants, are

disposed round the stalk and branches with the same symmetry. Some are simple, others compound, or formed of various foliage. One sort is plain, another indented. Some of them are very thin; others hard, soft, plump; smooth, rough, hairy, &c.

The flowers, whose beautiful enamel is one of the principal glories of Nature, are not less diversified than the leaves. Some have only a single leaf, or petal: others several. Here it appears like a large vessel gracefully opening: there it forms some grotesque figure, in imitation of a muzzle, head-piece, or cowl. Here it is a butterfly, a star, a crown, a radiant sun. Some are scattered on the plant without any art? some compose nosegays, globes, tufts of feathers, garlands, pyramids, &c. The greater part of them are furnished with a *calyx*; sometimes plain and simple; sometimes consisting of several pieces, or properly cut. From the centre of the flower proceeds one or more little pillars, called *pistils*, which are either smooth or channelled, rounded at top, or terminating in a point. These commonly encircle other smaller pillars, called *stamina*, which carry on the upper part of them a sort of small bladders, full of an exceedingly fine powder, called the *pollen*, or fertilizing dust; every grain of which, viewed through a microscope, appears of a very regular figure, but varied according to its species. In some they are small smooth globes; in others they are thickly set with prickles, like the covering of a chesnut; and sometimes they resemble small prisms, or some other regular body. The flowers are succeeded by an infinite profusion of fruit and seed.

Upon accurate anatomical analysis of all the parts of a plant, there are only two organical parts, essentially distinct, viz. the *pithy*, and the *ligneous* parts; and as every part has two, the whole vegetable is a composition of two only. All woody parts, strings, and fibres, are one body; all simple barks, piths, parenchymas, pulps, peels and skins, are, likewise, one body; the several parts of a vegetable differing only by their various proportions, mixtures, pores, and structure. These parts have the general appellations of the *Vascular System*, and *Cellular Tissue*, of plants.

The *vascular* system means all those parts of a plant

which do not exhibit the form of either membrane or cells. It constitutes most of the more solid parts of trees. To common observation, a piece of dry wood appears as a mass of solid fibres; a series of particles arranged in a filiform figure, and destitute of any continuous canal. All that part of a plant, whether herb or tree, properly called the woody part, is a cluster of innumerable and most extraordinary small vessels.*

Vessels exist in most parts of a plant. In animals, the fluids are conveyed to a central reservoir, called the heart, whence they are sent through the body. Near this reservoir the vessels are few, but large in size; and they diminish and multiply as they recede. Plants have no such reservoir; the fluids enter by innumerable mouths, and are distributed equally through all the parts. There is little variation in the diameter of the vessels; and their general figure is cylindrical.

From the extreme minuteness of the vessels, it prevents the computing of their number. By drying off their fluids without destroying their figure, (as in preparing charcoal,) Hooke numbered, in $\frac{1}{8}$ th of an inch long, 150 vessels; in a line an inch long, there would be 2700, and in the surface of a square inch, 7,290,000 vessels, which would seem incredible, could not every one verify the fact. In Guaiacum wood the vessels are more minute. In a piece of oak, about $\frac{1}{9}$ th of a square inch, Leuwenhoeck reckoned 20,000 vessels; so that in an oak-tree of one foot in circumference, or about four inches in diameter, there will be found, according to his computation, 200,000,000 of such vessels. The largest vessel observed by Hedwig, in the gourd stem, appeared $\frac{1}{2}$ th of an inch in diameter; if his instrument magnified 290 times, the true diameter would be the 3480th part of an inch, giving for the square inch 12,110,400 vessels. In certain plants, however, the vessels are obvious to the naked eye, and some acquire a large size.

The vessels of plants are collected into fasciculi, or bundles, often appearing as single vessels. In the stems of herbs, and in roots, small fasciculi are observed

* See the engravings of the sections of the oak and ash, as viewed through a powerful microscope.

composed of from 30 to above 100 vessels. The direction in the trunk is most perpendicular, in other parts often oblique; and of various figures in their smaller ramifications. In herbs, the fasciculi are more or less numerous, and often at considerable distances, like small columns dispersed through the cellular tissue; in other instances, they are more numerous, but destitute of symmetrical arrangement; while, in trees, they are regular around the axis, presenting, in their transverse section, the well-known appearance of concentric circles in the wood.

All fruits and seeds have this property in common, that they inclose, under one or more coverings, the germ of the future plants. Some have only such coverings as immediately infold the germ, whose outside is of the strongest contexture; and, among these, there are some that are provided with wings, tufts, plumes of feathers, &c. by means of which they are conveyed in the air or water, so as to be transported and sown in different parts. Others are better clothed: being lodged in seeds or pods, inclosed in a kind of box, having one or more partitions. A third sort, under a delicious fruit, which is rendered still more agreeable by its beautiful colour, contain a stone and kernel. Others are inclosed in shells, which are either armed with prickles, abound with a bitter juice, or are adorned with a very fine down or hair. The outside of fruits and seeds, moreover, do not afford less variety than that of the leaves and flowers, there being scarcely any figure whatever of which they do not exhibit an exact representation.

The internal are composed of four orders of vessels, namely, the *ligneous fibres*, the *utriculi* or *little bags*, the *proper vases*, and the *tracheæ* or *air-vessels*.

The ligneous fibres are very small channels deposited according to the length of the plant, and consist of little tubes placed near each other. Sometimes these vessels are parallel, and at others are separated, leaving between them intervals, or oblong spaces, which are filled by the utriculi, a kind of membranous bladders, horizontally disposed, and communicating with each other. The proper vessels are a kind of ligneous fibres, that differ from the rest principally in their juice, which is of a deeper colour, or thicker. In the middle of

these, or round a great number of ligneous fibres, are some vessels, which are not so narrow, composed of a silvery elastic blade, formed spirewise, like a spring. These are arteries, and seldom contain any thing but air.

These four orders of vessels, which are dispersed through all the parts of the vegetable, in proportion to the nature and functions of each, compose, at least in trees and shrubs, three principal and concentric beds, the bark, the wood, and the pith. The bark, or rind, which is the outer covering, is smooth, even, and shining in some, and rough, channelled, and hairy in others: it is formed of the widest fibres, that are the least pressed together, and which admit within them the most air. The wood, which is placed under the rind, has, on the contrary, narrower and more contracted tubes. Its utricles are less replenished or dilated; and this only has arteries. The pith, which is situated in the heart of the plant, is little more than a collection of utricles, which are more capacious than those of the bark and wood.

Their nutrition is effected by their roots and leaves. The saline, unctuous, and subtile slime, which the water separates from the coarse earth, and keeps in a dissolved state, is the principal nutriment of plants. The different species of manure only contribute to the fertilizing of land, in proportion as they introduce into it a greater quantity of a spongy powder or active salt.

After having been admitted into the body of the root by the extremity of the fibres, the nutritious juice rises into the ligneous fibres from the trunk or stalk, and passes into the utricles that adhere to them. It is there prepared and digested. It afterwards enters into the proper vessels, under the form of a coloured fluid, more or less thick, which we may conjecture to be with respect to the plant, what the chyle or blood is to an animal. Being filtered by the finer or more winding tubes, it is at last conveyed to all the parts, to which it unites, and increases their bulk.

The quantity of nutriment which a plant derives from the earth is in proportion to the number and size of its leaves; the smaller and fewer in number the leaves are, the less it requires.

The nutrition of vegetables is likewise effected immediately by their leaves. They not only serve for raising

the sap, preparing it, and discharging its superfluity, but they pump as it were from the air the juices they transmit to the neighbouring parts. The dew, which arises from the ground, is the principal foundation of this aërial nourishment. The leaves present to it their inferior surface, which is always furnished with an infinite number of small pipes, that are always ready to absorb it. And that the leaves may receive no prejudice in the exercise of this function, they are dispersed with such art on the stalk and branches, that those which immediately precede, do not cover such as succeed them. Sometimes they are placed alternately on two opposite and parallel lines. Sometimes they are distributed by pairs, that cross each other at right angles. Sometimes they are ranged on the angles of polygons circumscribed on the branches, and so disposed, that the angles of the inferior polygon correspond with the sides of the superior. And sometimes the leaves ascend the whole length of the stalk and branches, in one or more parallel spiral lines.

If a small branch of an apple-tree, a chesnut, or a common spurge, be so placed several days in a decoction of madder, or an infusion of the skins of black grape, that the lower part of the stem, and some of the undermost leaves are immersed, the colouring fluid will be beautifully visible along the middle rib of each leaf, after washing them in water. On the upper surface it extends through different vessels to the extremity of each leaf; on the under surface numerous vessels carry a milky juice from the extremities, and lose themselves in large veins on each side of the red artery, which descends to the foot-stalks of the leaf. On slitting one of these leaves with a pair of scissars, the milky fluid oozes out of the returning veins. Darwin made an experiment on some large fig-leaves, and a sprig of yellow suecory. When the stalk was divided, an internal circle of red points became visible, the ends of absorbent vessels coloured red; whilst an external ring of red arteries were seen to rapidly effuse a milky juice.

It is evident, these experiments evince that water, absorbed by the root, becomes sap, undergoing some change, probably analogous to digestion. The stem is not an essential organ; as leaves and flowers often spring immediately from the root.

Part of the sap is conveyed into the flowers and fruit, where are made many fine and essential secretions; but it does not apparently return from thence, as from the leaves, to answer any further end.

The change of colour in the leaves of vegetables, probably occasioned by the oxygen of the atmosphere acting on the vegetable matter deprived of the protection of the vital principle, may guide the naturalist, who directs his attention to the discovery of new

objects for the use of the dyer. For the leaves of those trees, whose bark or wood produces a dye, change in autumn to that colour extracted in the dyers' vats from the woods, especially by mordants, as allum, &c., which yield oxygen: thus, the foliage of the hickory and oak, which produce quercitron bark, is changed before its fall into a beautiful yellow. Other oaks assume a fawn, liver, or blood colour, and yield dyes of the same tint.

By a mechanism, which is doubtless very simple, the root of the plant forces itself into the earth, the branches shoot out on each side, the leaves expose their superior surface to the open air, and their inferior surface to the earth, or the inner part of the plant. If a seed be sown the contrary way, its *radicle* and the little stalk will each bend backward; the former to penetrate into the earth, and the latter to gain the air. If a young stalk be kept inclined, its extremity, notwithstanding, will grow upright. Bending the branches of all sorts of plants; cause the inferior surfaces of their leaves to turn upwards, and all these leaves will resume their former position.

Dr. Hales has demonstrated, that the sap does not circulate, but that it *ascends* and *descends*. To understand the motion of the sap, according to his principles, it is to be considered, that during the heat of a summer's day, all plants perspire freely from the pores of their leaves and bark. At that time, their juices are highly rarefied. The diameters of the tracheæ, or air-vessels, are enlarged, so as to press upon and straiten the vessels that carry the sap; in consequence of which their juices, not being able to escape by the roots, are pressed upward, where there is the least resistance, and perspire off the excrementitious parts by the leaves and branches, in the form of vapour. When the solar heat declines, the tracheæ are contracted, the sap-vessels are enlarged, and the sap sinks down in the manner of the spirits of a thermometer. In consequence of this change, the capillary vessels of the leaves and top branches become empty. Being surrounded with the humid vapours of the evening, they fill themselves, and send down the new-acquired juices to be mixed with those that are more elaborated. The same cause always produces the same effect; and this alternate ascent and descent, through the same system of vessels, continues as long as the plant lives. The irregular motion of the stem and

branches contributes to the ascent of the sap. Whenever these parts are agitated by wind, they are made to assume a variety of angles, whereby the sap-vessels are suddenly straitened. The contained juices consequently receive reiterated impulses, similar to what happens to the blood of animals from the contraction of the heart.

The green colour of leaves is owing to the powerful effect of light upon the vegetable kingdom. Plants raised in darkness are of a sickly white; and when light is admitted to a vegetable, through panes tinged with different prismatic colours, the leaves are paler in proportion as the glass approaches nearer to violet.—Blanched plants, exposed to light, soon acquire their natural hue; and, even in the dark, will not lose it, if exposed to the action of hydrogen gas. We can no more form a judgment of what the mind enveloped in ignorance really is, than what a plant is that grows in darkness.

The chemical actions of light, heat, and the component parts of the atmospheric air upon leaves, or the green stems of plants, is now explained on the principles of improved chemistry. In the day-time, plants imbibe carbonic acid gas from the atmosphere; they then decompose it, absorb the carbon for nourishment, added to the sap, and emit the oxygen. They also absorb the same gas from water, when separated by heat. In the dark, plants give out carbon, and absorb oxygen; but in less proportion than what they exhale by day; else the quantity of the latter, added to their substance, would be trifling; especially where the proportion of day to night is nearly equal; yet known to be very luxuriant in vegetation. Plants also give out azotic gas; but this is a sign of approaching decay.

Vegetables, by a natural peculiar process, absorb carbonic acid gas, and give out oxygen gas; for, placed in air, too impure to support the respiration, or flame, they will thrive, and soon purify it. Hence the oxygen of the atmosphere would, in time, be consumed by the breathing of animals, and by flame, but for this singular provision, which enables the leaves of vegetables to supply oxygen, and keep up the due proportion necessary to support animal life.



